Carter Against Bell Bill (Maybe)

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – There is not enough competition now in the communications business, Democratic Presidential contender Jimmy Carter recently told a consumer meeting sponsored by the Public Citizen Forum, a Ralph Nader organization.

Carter further stated that the pending Justice Department antitrust suit against AT&T is a good move in the right direction. The former governor added that the Bell-sponsored Consumer Communications Reform Act is not needed at this time.

Carter said he was personally familiar with instances which involved the right of competitive companies to provide telephone equipment within a motel, hotel or large business. He called these situations a legitimate reason for a place for competition.

The candidate said he had not been presented with any proof that there is too much competition within the communications industry now.

On the antitrust suit against AT&T, Carter said it seems to be a move in the right direction, although he is not familiar with all the details. At this time there seems to be no need for corrective legislation in the area of competition, he added.

The Carter comments were quoted in *Telecommunications Reports*, which included additional statements by the Democratic candidate that he had not been fully briefed on either the suit or the pending Bell-sponsored legislation.

A spokesman in Carter's Washington office said the comments made at the consumer meeting were not meant to be an official position; the candidate has not yet formed a final opinion on either issue, he added.

Other Washington sources said Carter's staff was being very hesitant on commenting and the candidate might have been "testing the water" with his statements at the consumer meeting.

Previously, at the Democratic National Convention, Carter had introduced Glen Watts, chief of the Communications Workers of America (CWA), on the night of his nomination. The CWA has strongly supported the Bell legislation since many of its members work for the Bell System.

In a recent speech before a consumer meeting in Cleveland, Watts backed the Reform Act and spoke out against competition.

The candidate said he planned to be a consumer advocate and to replace Ralph Nader as the top consumerist in the country. Industry sources said Carter privately assured the Nader people

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Trial Documents Show IBM Took Risk With 360 Line

By Edith Holmes
Of the CW Staff

NEW YORK – System 360 – its name was intended to denote IBM's "full circle" coverage of computing. IBM's "Brave New World."

This series of compatible mainframes that made IBM the unquestioned leader in the overall computer marketplace was called the "Brave New World" within the corporation's upper management because of the risk as well as the innovation it involved.

These are some of the facts the court hearing the trial of the government's antitrust case against IBM was given to understand through recent readings from the depositions of key IBM officials.

The Product Test Department of the Data Systems Division did not support the announcement of the 360 computers by their actual announcement date – April 7, 1964, according to Gilbert B. McCarter, who was manager of Product Test at the time.

Further testing was needed to confirm the models' technical suitability, McCarter said, adding this fact was made known to members of top management at a March 1964 meeting.

Noting the Model 40 was the furthest along in testing and the models 30 and 70 had not yet come under the scrutiny of Product Test, he stated testing of the 360 CPUs would require another three to six months.

McCarter said he couldn't remember

(Continued on Page 4)

IBM Hikes Upkeep on DPD Gear

By Nancy French
Of the CW Staff

WHITE PLAINS, N.Y. – Users of IBM equipment will pay higher contract maintenance bills on about one-third of the equipment sold by the mainframer's Data Processing Division (DPD) as of Nov. 16, IBM announced last week.

In addition, hourly service rates for all of IBM's DPD and General Systems Division equipment as well as for systems engineering will be increased by 15% immediately.

Contract maintenance for 332 products, including GSD equipment and "newer" gear "first shipped" by DPD in the past 12 months, will not be affected, IBM said.

The changes in contract maintenance prices, which include four increases for every decrease, affect equipment across the board – CPUs, disk and tape drives, terminals, printers, communications controllers and card reader/punches.

All models and some features of the 370/115-0 and 115-2 CPU will increase 5% and all models and some features of the 370/125-0 and 125-2 CPU will increase by 10%, an IBM spokesman said.

In the 360 line, 10% increases were

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Amdahl or IBM? Tennessee Can't Decide

By Toni Wiseman
Of the CW Staff

NASHVILLE, Tenn. – With IBM proponents in one corner squaring off against Amdahl advocates in the other, no one is sure what the outcome of the state of Tennessee match will be – a bout which may well be called on a RFP technicality.

The atmosphere surrounding the acquisition of a new central processor for the state's DP center has been alternately called "a discussion," "a controversy," "a free-for-all," "a near shoot-out" and "a prime example of political favoritism."

The issues in this matter include IBM vs Amdahl, backup insurance vs. throughput and short-term vs. long-term plans. State house observers have noted that Republican vs. Democrat is also an issue in this election year.

"Our DP equipment, on a CPU basis, was created under a Republican administration and the legislature is Democratic," an observer stated. "Since the first machine went in, equipment has been added on an open-ended basis and they've been adding IBM on and on."

The state DP center currently has an IBM 370/158, 370/155 and 360/50. At press time, a legislative DP committee had recommended the state purchase an Amdahl system. The Department of Finance and Administration, however, has the last say and no decision is expected for the next two weeks.

When the DP center found it was quickly running out of computing power and was faced with two large systems coming on-line in the next few months, requests for proposals (RFPs) were issued to vendors on the state's list of prequalified bidders.

Of the seven or eight bids which were returned, three were qualified, according to William Jones, commissioner of finance. These included a used 370/158 from Federal Leasing, a new 370/158 from IBM and an Amdahl 470V/6.

The bids were then reviewed by the legislative DP committee which consists of the chairmen of the Finance Ways and Means committees of the House and Senate, the chairman of the Fiscal Review Committee, the state auditor and the state treasurer.

Amdahl Wins Vote

Based on a price/performance evaluation, the committee recommended acquisition of the Amdahl by a vote of 4-0.

"We found that Amdahl was the lowest responsible, qualified bidder," according to Don Morton, executive director of the Fiscal Review Committee. "And our statutes clearly provide for us to consider price/performance as a relevant factor in a bid."

While the DP center knew it needed more computing power, it also felt it needed backup ability for crucial applications such as law enforcement, Jones said. Therefore, the bid was for a second CPU

(Continued on Page 2)

Revamp of New York City's DP Seen Saving Initial $5 Million

By Catherine Arnst
Of the CW Staff

NEW YORK – Debt-ridden New York City could save as much as $5 million in the short run if it consolidated and overhauled its DP operations, a report issued late last month told the mayor.

The study, conducted by the DP Task Force of the mayor's Management Advisory Board, cited the lack of a focal point for citywide DP activities, underutilization of present systems and severe shortage of qualified DP personnel as the major problems with this city's computer operation.

"The first and most important action the city should take is to establish a Data Processing Plans and Control Unit" to coordinate its computer activities, the report recommended.

Besides the $5 million in the short run, further savings could be realized over the long run "by selectively reactivating some of the developmental projects which have been halted by the fiscal crisis," the task force suggested.

The Management Advisory Board was established by Mayor Abraham Beame following criticism of the city's fiscal practices by Treasury Secretary William E. Simon. One of the board's first assignments was to study the city's $66.6 million computer operation.

Concurrent with the release of the report, Beame acted on the task force's

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Updates Optimize IMS/VS, CICS/VS; Data Dictionary to Support DL/1 User

By Don Leavitt
Of the CW Staff

WHITE PLAINS, N.Y. – IBM has announced enhancements to its Information Management System (IMS/VS) and Customer Information Control System (CICS/VS) data base/data communication (DB/DC) products.

The company has also introduced a DB/DC Data Dictionary for use with IMS/VS or with Data Language/1 under DOS/VS.

IMS/VS Version 1 Release 1.3, ready now, gives the 3790 communication system the capability to handle all valid IMS/VS transactions, IBM said.

Additional terminal support provides 3277 data stream compatibility and 3790 disk support through the 3790 batch controller function, the company added.

A Vtam-authorized path for IMS/VS users operating with Vtam terminal support under MVS decreases the number of instructions used under certain IMS/VS features, according to a spokesman.

Fewer instructions and less resource allocation contention are the twin goals for the separately priced Fast Path feature for the IMS/VS user. A cutback in the coding required for transaction processing, a reduction in the I/O operations for data base operations and increased parallel processing are all possible with Fast Path, IBM said.

A Multiple Systems Coupling (MSC) feature is expected to allow the user to decentralize and distribute his workload to multiple IMS/VS systems on multiple 370s – in uniprocessor, multi-processor or attached-processor configurations.

Planned availability for Fast Path for use with MVS is July 29, 1977; for use with VS1 and SVS, three months later. MSC will be available next month for use with VS1 and MVS, IBM noted.

IMS/VS Version 1 Release 3.0 costs $808/mo; the additional monthly license fees will be $1,250 for Fast Path and $875 for MSC.

CICS Enhancements

CICS/VS Version 1 Release 3.0, scheduled for distribution early next year, will include a high-performance option designed to provide support for high transaction rates for CICS/OS/VS users running on Multiple Virtual Storage (MVS), according to IBM.

Dynamic Transaction Backout will offer recovery of the data base and other transaction resources following the failure of any one transaction; the High Level Programming Interface will simplify Cobol and PL/I access to CICS/VS, the spokesman added.

Without going into specific details, he said "preassembled CICS/VS modules and tables which provide a system ready for use or easily customized at system generation or initialization time" would also be part of the enhanced package.

CICS/VS support of enhanced Vsam functions will include a facility for building and maintaining alternate indexes, permitting access to a single data set through multiple keys and a logical backward processing capability, he continued.

The update will also include extended support of the 3790 communications system and support, through Btam, for the 3660 supermarket and 3600 finance communication systems, IBM noted.

CICS/DOS/VS is expected to be available at the end of February for $475/mo. The CICS/OS/VS package will be ready two months later and cost $1,000/mo.

Data Dictionary

The DB/DC Data Dictionary set for release next month supports the data base administration function by storing, processing and reporting definitions or descriptions of data in the system and its use by the application programs, IBM explained.

Operating as an application program, the dictionary can be used on-line through an IBM 3270 CRT terminal under IMS/VS. The DL/1 version operates in batch mode only, the company said.

Users enter definitions of data resources through a dictionary command language or an interactive display facility. The definitions may include several types of data, including subject name, aliases, attributes, description, user data, cross-references and other relationship data.

The command language also supports maintenance and administrative use of the stored data definitions. Provisions are made for storing non-DL/1 data and user-unique data, enabling installations to integrate all their data definitions into one central dictionary, he said.

The dictionary will be available Sept. 3 at $580/mo for OS/VS users, $290/mo for DOS/VS shops.

All of the software packages included in IBM's announcement are classified as program products, with centralized maintenance and support, the vendor noted.

Tenn. at Odds on CPU Purchase

(Continued from Page 1)

which would be used in a multiprocessor (MP) configuration with the first, he said.

The pro-IBM and the pro-Amdahl factions "discussed" the issues at a "very heated" session.

The question of backup was a large point of contention, according to Morton, but the committee eventually decided "just to vote to purchase the Amdahl" and let the DP center decide whether to trade in the 370/158 at a later date.

Amdahl had bid to replace the 158, either using the older equipment as trade-in on the price or on a straight gross price basis, Morton said.

"If they [the DP center] decide to keep the IBM, the price of the Amdahl does shoot up, but even with the gross price based on everything we've been able to determine, on a price/performance basis Amdahl is still low bidder, even without the trade-in," he averred.

One side's argument that the Amdahl machine was new and as yet unproven, with only 15 installations, was countered by the argument these facts were known when the RFPs were issued and Amdahl was on the qualified bidder list.

"And besides, even though Amdahl is a new company, there is a lot of experience there in terms of people. Look at Dr. Amdahl himself," Morton said.

An argument that no Amdahl users are currently running a production IMS/VS system was shot down when three such shops were found to be running well.

Finally, it was argued that there is no known secondary market for Amdahl equipment.

"I agree, that's true," Morton said. "But I don't think you can presume that if it's as good a machine with all the technical features everyone says it has, that there won't be a secondary market in the future."

Jones feels the problem centers around an interpretation of the RFP. "The legislative committee is looking for a five-year plan in data processing. We're looking for a backup system," he said.

Noting that the Amdahl bid was not essentially for the same system as the other bids (those for a backup system), Jones opined that a new set of RFPs might have to be sent out if the bid is indeed for a replacement.

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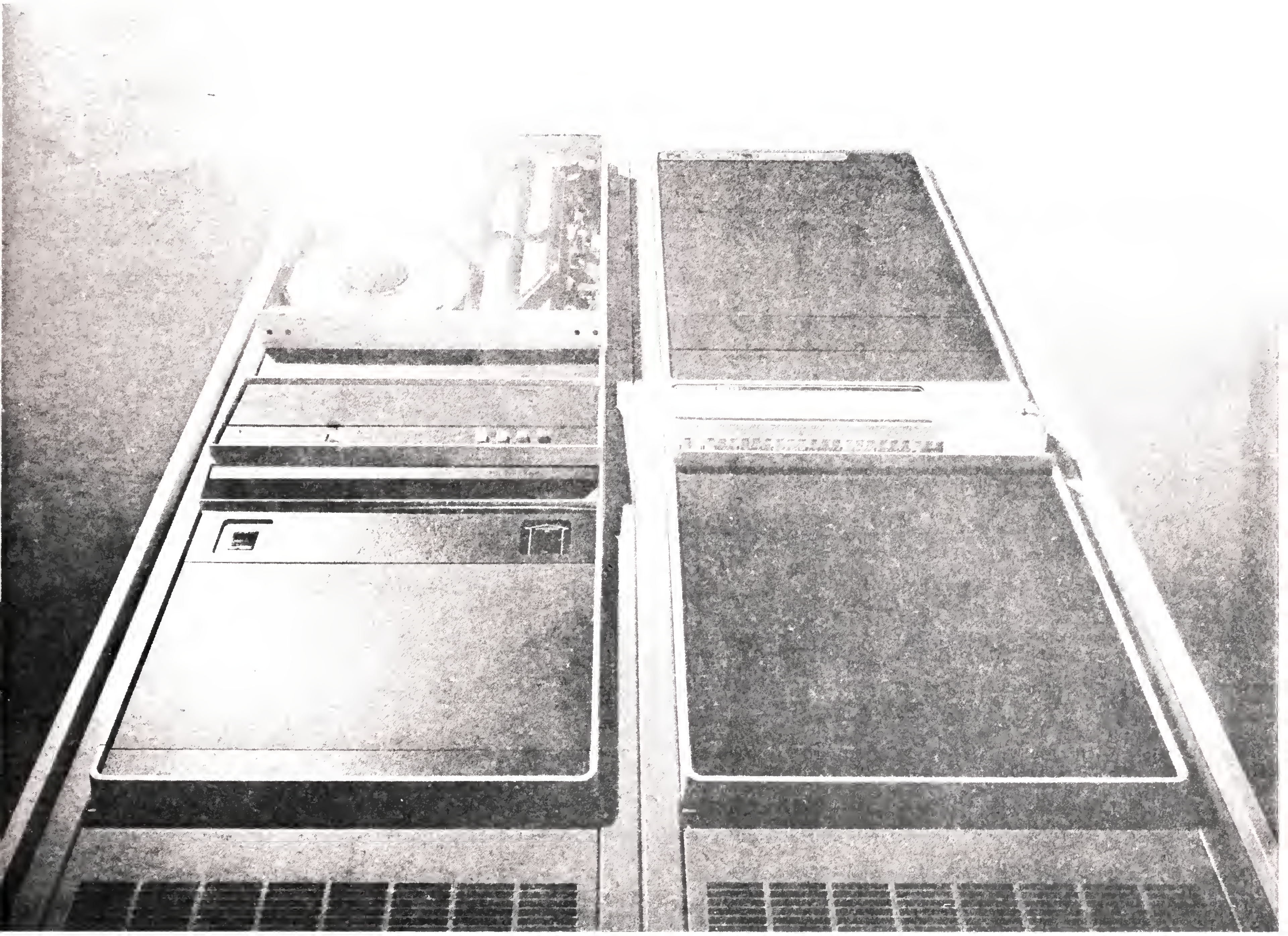

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Documents in U.S. vs. IBM Indicate

IBM 360/90 Designed to Save Face in Marketplace

By Edith Holmes
Of the CW Staff

NEW YORK – On Aug. 20, 1963, Dr. Harwood Kolsky, a senior engineer with IBM, wrote to the corporation's top management about his concern over IBM's position with respect to "Gold Chip" customers.

On Sept. 5, 1963, IBM's upper crust met at an executive conference held at Jenny Lake, Wyo. Among the topics discussed was IBM's potential loss of the prestigious large-scale scientific market to the upstart Control Data Corp. with its 6600.

On Sept 9, 1963, Thomas J. Watson Jr., then chairman of the IBM board, sent Kolsky's analysis of the situation in "supercomputing" at the Atomic Energy Commission (AEC) laboratories – Los Alamos in particular – to many of those who attended the Jenny Lake meeting.

Commenting on Kolsky's tour of duty as a consultant at Los Alamos. Watson said, "Dr. Kolsky . . . had a unique opportunity to look at the IBM company from a customer point of view. What he saw should be of grave concern to all of us, for it is symptomatic of many of the things we discussed at the conference."

A member of the Advanced Systems Development Division (ASDD) at IBM's San Jose Laboratory, Kolsky said "the cold facts show that almost all of the AEC labs presently have competitive equipment installed or on order, much of it earmarked to replace IBM equipment."

Evidence in Trial

These 1963 exchanges between Kolsky and Watson and Watson and A.L. Williams, president of IBM at the time, have been revived here recently by the U.S. government as part of the evidence it is putting before the court hearing the trial of its antitrust suit against IBM.

Attorneys with the Justice Department plan to present some 140 documents over the next few weeks – documents the government claims will tell the story of how IBM came to recognize the need for a successor to its late 1950s supercomputer "Stretch."

The Kolsky documents summarize much of the IBM thinking, spread through many of the trial exhibits now being introduced into evidence, that led to the announcement of the 360/90 – a CPU the government calls "a classic fighting machine."

In his memo to management entitled "Some Comments on the AEC Computer Situation," Kolsky warned there had been internal meetings within the AEC computing community "at which a strong case has been made for all the laboratories to standardize on CDC equipment (the 3600 in particular).

"The arguments were mainly that this equipment is more modern and more nearly fits the standard scientific problems of the AEC than does the IBM product line, which they feel is now becoming too expensive and obsolete technologically," the senior engineer continued.

"The on-order position for the AEC at present shows that IBM has something like 10% of the machines on order, instead of the 70% which one would expect from our percent of the total market," he added.

Kolsky maintained that "only a bold stroke will save the day . . . in particular, the stroke of signing a contract with one of the AEC Laboratories for a Super-Stretch machine (meaning one at least five times Stretch performance on AEC problems)."

He tried to point out to management the fallacies contained in the view of the computing market as a pyramid with a few extremely large users, including the AEC laboratories, at the top.

From the pyramid perspective, "the market broadens down to include aerospace industries and other government-supported groups next, then the larger commercial users and, finally, layers of smaller and smaller commercial users," Kolsky stated, adding "the number of installations increases rapidly as one goes down in size.

"If one optimizes a computer design on the basis of income, it always turns out that a design aimed for the middle of the pyramid or the lower middle of the pyramid will result in far greater total income than one tailored either for the top, 'Gold Chip' customers, or for the bottom myriad of small potential users where the competition is quite fierce," he noted.

IBM's New Product Line (NPL), later called the System 360 series, was based on this market description, Kolsky observed. Even the notion of compatibility was oriented around total profit, and so around the middle of the pyramid.

"Unfortunately, profit is not the only thing which is important in this game," he added. "The two dozen or so 'Gold Chip' customers are really the fashion setters for thousands of smaller users throughout the industry."

While they may not represent a particularly profitable market, they do constitute an extremely influential market, Kolsky asserted.

He noted further that many commercial customers – even the smallest ones – needed to be able to identify themselves with the most far-reaching machines, despite the fact that their growth would never require systems with the most advanced capabilities.

"IBM, by not having a Stretch-like pacesetter in the market, has lost a great deal of this psychological advantage in the computing industry," Kolsky said.

The CDC 6600 had captured this advantage by captivating the large-scale scientific market, he stated. "The CDC 3600 is clearly going to be much more of a profit maker for CDC than the 6600 will be, yet [CDC is] willing to undertake this 6600 largely for the reason that it gives them the prestige of being the pace setter in the computing industry, and it will breed customers for their smaller machines."

If IBM was to save the AEC customers and maintain its name and equipment at other "Gold Chip" accounts, the corporation had to seek out a contract with at least one AEC laboratory "for a very high-speed computer having at least the performance of Stretch on AEC problems.

The computer Kolsky proposed that IBM build had to be a deliberate "state-of-the-art stretcher," a deliberate "competition-stopper," a deliberate "prestige-gainer," a deliberate "money-loser."

If calling the machine to be developed a "money-loser" was putting matters too strongly, Kolsky suggested it be termed "a shared-cost development for the benefit of the government."

If losing money on such a machine was a problem, mangement should remember "the indirect benefits to be gained will really make it very profitable," he added.

In other documents dealing with what was to become the 360/90, Watson repeatedly expressed his concern that IBM would lose its leadership position in the industry if it didn't make "the world's fastest computer." The IBM chairman of the board marvelled that CDC could produce the 6600 in only 18 months and in a laboratory with only 35 people.

The 6600 and the demands made by the "Gold Chip" accounts caused IBM to decide it had to have a machine more powerful than its NPL 501, later the 360/70, the IBM documents indicate.

IBM also had a "Project X" under way designed to outperform the CDC 6600, but its completion was too far off. Documents suggest IBM planned to have an interim machine, the 602, stopgap the performance range between the 360/70 and "Project X."

Later the 602 became the 604; and finally, by the 360 series announcement on April 7, 1964, the machine intended to rival the CDC 6600 was referred to inside IBM as the Model 90.

Papers Show IBM Took Deliberate Risk With 360

(Continued from Page 1)

whether the competitive environment was the reason behind the April 7, 1964 announcement of the 360 series. In February of that year, he had voiced his fears about the technical risks and exposure involved in trying to make all the 360 CPUs hardware-compatible with each other to the corporate processor manager, Dr. Frederick P. Brooks Jr.

In his memo to Brooks, McCarter also indicated top management was having its doubts. Brooks wrote back, "I'm not scared. You are . . . Go get a team of watchers and I'll tell them what questions to ask. Send in your auditors if you're not satisfied with my word. But do it quick."

To ensure there would be no slipups in the development of 360 hardware compatibility, Brooks sent his response to all the people working for him and added the message: "Make compatibility work." He indicated in his deposition, "My boys got the word."

Brooks also said he recommended the 360 be introduced that spring rather than later in the summer or fall of 1964. While he didn't know the reasons IBM eventually followed that course, the corporate processor manager, who later managed the development of the 360 operating system as well, added he believed the machines needed a year's lead time after announcement in order to educate users, customer engineers and management about them before their delivery.

Serious Consequences

Users uneducated in the device and its capabilities were likely to delay installations – with serious revenue consequences to IBM, Brooks noted.

In addition, he stated the 360 had been tested thoroughly enough to justify going ahead with the announcement and beginning pricing.

IBM had joint projects with users in which both parties had revealed proprietary information. For this reason as well, IBM needed to let everyone know what it was doing, Brooks said.

He had always advocated the 360 series be announced as such, particularly since the relationships between its pieces were complex. Piecemeal announcement, beginning with the Model 30, would also confuse and demoralize the field sales force, Brooks maintained.

The 360 series was more risky than "Stretch," IBM's joint project with the U.S. Bureau of Ships in the late 1950s to develop a "supercomputer," he said.

But the corporation was "doing the best" it could "as fast" as it could. There was no reason "to stick anything on a shelf while other skilled equipment developers moved forward," Brooks stated.

Carter Takes Stand Against Reform Act

(Continued from Page 1)

he opposed the Bell bill, designed to eliminate competition authorized by the Federal Communications Commission.

A source close to the Carter campaign in Atlanta said the candidate's "issues group" is working on the Reform Act and other pending legislation. Based on this analysis, Carter is expected to release a statement taking a stand on the Reform Act "within three weeks," the source said.

But campaign officials are not willing to issue a general policy on how Carter will deal with pending legislation, the source added.

"If he said that in a speech, then that is what he said. But there will be no further comment on this legislation," a spokesman at Carter headquarters in Atlanta said.

"There has been no further specific comment on this bill and there probably will not be," she added.

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N.Y. DP Revamp Seen Saving $5 Million in Short Run

(Continued from Page 1)

recommendation for a plans and control unit, which it termed "the key operational recommendation of this report," and appointed Dr. Kenneth M. King, dean of computer systems at City University, to head such a unit for six months.

Action on other recommendations in the report will be delayed until King's unit makes its report, a spokesman for the mayor's office said.

The task force's recommendation requiring the most radical action concerned personnel in the city's DP operations. "There is a severe shortage of qualified DP personnel due to layoffs, low morale and poor personnel practices. The city must make changes in Civil Service recruitment and training systems," the report emphasized.

During the task force's review, "it became obvious that the city's cutbacks in personnel were of almost universal concern to the people interviewed. Without exception, all installation directors stated that the lack of qualified personnel was severely impacting some portion of their operation," the report added.

Some of the suggestions made to alleviate this situation included "development of the best individual for a *specific* job, regardless of his position on the [Civil Service] list for a *type* of job"; development of an "effective means to transfer skilled employees between agencies"; and the design of mechanisms to hire individuals with critical skills which do not match the existing Civil Service structure.

These three recommendations "would be difficult to [implement] in the Civil Service system as it now stands," the mayor's spokesman said. "It would be difficult to scrap the Civil Service system and it is probably illegal."

The city is also under "a fairly strict hiring freeze," he added, making it even more difficult to change hiring practices.

The task force suggested that the development of new DP programs, which were virtually ended during the city's fiscal crisis, be reactivated to some extent. Specifically, it mentioned systems planned by the Housing Development Administration, Human Resources Administration and the Health and Hospitals Corp., which would result in reimbursements to the city of an estimated $44.6 million annually.

A side effect of reducing developmental efforts, the report added, "is the demoralization and possible loss of key development people [who] are not motivated by maintenance assignments."

Data entry tasks, which are currently contracted to private companies at a cost of $3 million to the city, were also examined by the task force, which recommended that the city initiate a pilot project in the operation of a centralized data entry service.

"It is felt that such a facility could offer services that would lead to significant improvements in the overall operating efficiency. Furthermore, the city would begin to acquire experience and expertise in the effective management of production- and control-oriented data entry," the report said.

IBM Ups Maintenance For DPD Equipment

(Continued from Page 1)

announced for the 360/30, 40 and 44, 15% increases were announced for the 360/50, 65, 67 and the 75.

Contract maintenance for the 360/91 was cut by 10%, IBM said.

Contract maintenance for most IBM terminals and their control units will also cost more. In the 3270 series, the 3271 and 3273 control units will cost users 15% more to maintain under contract, as will the 3275 CRT. Contract maintenance on the 3277 will increase by 10%.

Contract maintenance for the 3770 series of remote job entry terminals will be up 10%, IBM said. Those affected are the 3771, 3773, 3774, 3775 and 3776. The 3777 will not be affected.

Other terminals affected by a 15% increase in contract maintenance prices include the 2741 typewriter terminal, the 2250 graphics CRT, the 2260 CRT, the 3735 programmable buffered terminal and the 3767 and 3780 communications terminals.

Communications controllers affected by a 10% increase include the 3704 and the 3705-1. The 3705-2 will not be affected, IBM said.

While users of the 3330 disk drive will be unaffected, users of the 3340 and the 2314 will pay 15% more for contract maintenance, IBM said. Contract maintenance for the 2311 disk drive will increase by 10%, while service contracts for the 2312, 2313 and 2318 will go up 5%.

Contract maintenance rates for most tape drives will be up 15%, affecting users of models 2401, 2402, 2403, 2404, 2415 and 2420. Maintenance on the 3420 will increase 10%.

Rates for the 1403, 1404, 1443, 3211 and 1053 printers will be up 15%, while rates charged for the 3784 will increase by 10%. Service for the 2213 will cost 5% less.

The newer 3203 and 3800 printers will be unaffected, IBM said.

Contract maintenance on the 1402 and 2540 reader/punches will cost 15% more; maintenance on the 3525 reader will increase only 10% and 5% on the 3505 card punch, IBM said.

Hourly rates for daytime service calls not covered under maintenance contract will be raised 15% for General Systems Division products as well as DPD products, effective immediately, IBM said.

The rate for repair of Class I DPD equipment, such as key entry equipment and terminals, will increase from $33.25- to $38/hour.

Class III hourly maintenance rates for DPD equipment, including 360/370 central processors, will increase from $44.25 to $50.75, IBM said.

Hourly maintenance rates for Class II or General Systems Division equipment will rise from $39 to $44.75, IBM said.

Finally, systems engineering services previously billed at a rate of $39.50/hour will cost $45.25/hour.

Correction

In "HIS Planning Migration Option for Xerox CP-V Users" [CW, June 28], it was reported that no memory map hardware is presently available for Sigma 5 users.

Memory map capability is available for Sigma 5 users from Telefile Computer Products, Inc. of Irvine, Calif.

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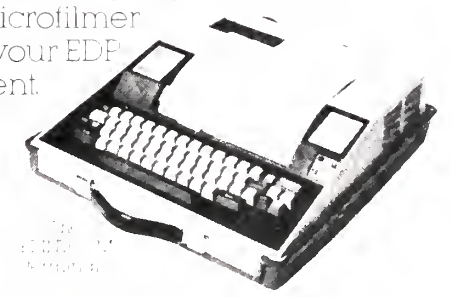

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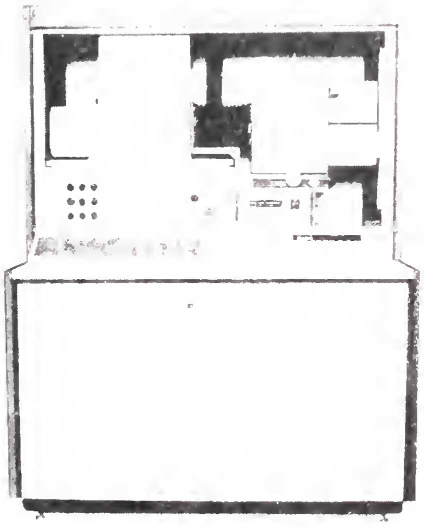

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Justice Readying Attack on IBM 'Fighting Machines'

By Edith Holmes
Of the CW Staff

NEW YORK – Were they plain old – albeit novel and innovative – product announcements?

Or were they "fighting machines," paper tigers ferocious enough to check Control Data Corp. in the large-scale scientific market, Digital Equipment Corp. in the intermediate scientific market, General Electric (GE) in time-sharing and Honeywell across the board?

These are the central questions in the latest trial phase of the U.S. government's antitrust case against IBM. Attorneys with the Justice Department will seek to prove IBM's initial announcements of the 360 line and, later, its 360/90, 360/44 and 360/67 represented marketplace conduct intended to buttress, and in some instances to create, a monopoly position in the computer industry.

For the next two to three months, the government will present the "fighting machines" or "product announcements" portion of its suit with as many as 1,000 internal IBM documents, the depositions of six IBM officials and one live witness – CDC's Robert D. Schmidt.

Meanwhile, IBM counsel will stress that the firm did not violate federal law, that these products were typical in terms of their technical preparedness at announcement time.

All these machines were expected to be profitable when announced, and one has only to look at the success of IBM's competition to know the last result these machines achieved was the maintenance of a monopoly position, the corporation told the court in its opening statement at the beginning of the trial a year ago last May.

In its opening statement, the government defined "fighting machines" as "selected computer products announced and introduced by IBM in markets or segments of markets in which competing computer firms threatened to achieve unusual success, thereby threatening IBM's overall monopoly position."

These machines were characterized by "precipitous or accelerated announcement" to customers before they were put through the traditional IBM testing and review procedures and when IBM management knew substantial technical risks were still present, the Justice Department said at the time.

In addition, fighting machines generally carry with them "unusually low profit expectations," the government added.

Justice Department attorneys will try to pin down just what the technical readiness of the 360 as a whole and of its models 90, 44 and 67 was at the time of announcement, what their profitability projections were and why IBM chose to introduce the machines when it did.

Origins of 360 Series

The 360 line had its origins in the Spread Committee report of December 1961, according to a stipulation, or agreement, between IBM and the government. Consisting of top technical and engineering IBMers, that committee recommended that IBM's next computer line be a family of six compatible machines.

The Spread Committee anticipated public announcement of the first models of the new product line in 1964. The machines were to have advanced technology and this, coupled with the novel compatibility feature, led the committee to recommend the entire line undergo thorough testing, Justice said.

By June of 1963, the schedule for the 360 series called for staggered announcements from 1964 to March 1965. But the strength of its competitors--and particularly Honeywell--caused IBM to disclose details about the 360 to selected users and accelerate its announcement to April 1964, the government has contended the documents will show.

Timing of Announcement

In proving premature announcement, the Justice Department will rely heavily on such facts as the absence of the support of the product test departments involved in the announcement, the early stage of testing of most of the processors and the lack of performance specifications for the basic software, which hadn't even entered product test.

Government attorneys told the court they want to show announcement timing was the result of marketing decisions. The April 7, 1964 announcement of the 360 series was intended to create a competitive jolt and prevent the threatened competition from making any inroads into IBM's established market position, according to Justice attorneys.

IBM hoped to and succeeded in discouraging customers from switching to competitors' equipment, despite significant slippage problems with 360 technology and deliveries, the Justice Department said.

'Prime Example'

Calling the 360/90 "a prime example of a fighting machine," the government intends to show this "supercomputer" was announced and then developed in response to the CDC 6600 which threatened to capture all large-scale scientific computing accounts in the summer of 1963.

When the Model 90 was announced, such a machine didn't even exist and its basic parameters had not yet been defined. In addition, the government plans to prove the 90 "was a substantial money loser," squandering more than $100 million.

IBM documents will show the 360/44 was designed to compete in the intermediate scientific market and its premature announcement was aimed to prevent competitors from establishing a foothold in the scientific marketplace, Justice said.

As with the Model 90, profit expectations for the Model 44 were low in comparison with the 30% of total revenue standard set for the rest of the 360 line, the government contended.

Initially, the Model 44 competed with CDC and Scientific Data Systems (SDS), although it later locked horns with machines from Digital Equipment Corp.

Described by the government as a machine "with the performance of the 360/50 and the price tag of the 360/30," the Model 44 was not completely compatible with the rest of the 360 line, it was not supported by product test at the time of its announcement and, after two years in the marketplace, it still was not really marketable and represented a several million dollar loss to IBM.

An afterthought to the 360, the Model 67 was a time-sharing machine designed to meet GE in this area of computing, the government said.

GE's work with MIT and its contract with Bell Labs caused IBM to fear it would lose similar "prestige" or "blue chip" accounts elsewhere; when the 67 was announced in August 1965, it had already been disclosed to some 100 customers, the government noted.

Once again, IBM's programming and product test operations did not agree the machine was ready for announcement, and low profit projections later became financial disaster on the order of a $100 million loss, according to the Justice Department.

"Only a company with the monopoly power of IBM could stand the losses resulting from programs like the Model 90 and the models 44 and 67," one attorney stated during the government's opening statement.

For its part, IBM counsel will try to prove the insignificance of the models 44, 67 and 90 in terms of the larger 360 series success.

In addition, the defense has stressed the success of the competition–particularly CDC and SDS–in the markets they pursued.

Referring to the original Spread Committee report, IBM will seek to show the 360 announcement was not premature.

Though product test was not in a position to make a statement of "routine" support in time for the April 7 announcement, every other department was, according to IBM.

In addition, it was not a function of product test at the time to determine whether a product should be released, the corporation will stress.

All these "so-called fighting machines" were expected to be profitable, the defense will assert, adding there are many ways to calculate profitability.

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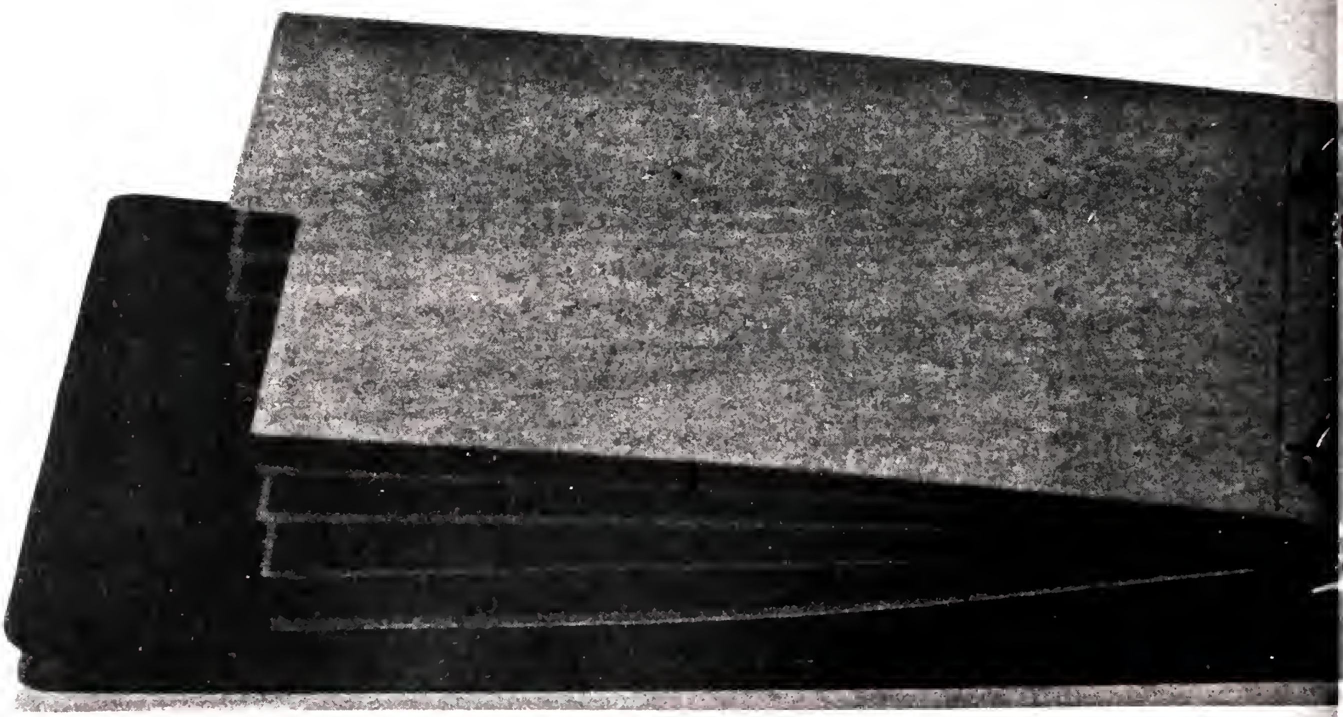


EFT Gaining Ground

Bank Expanding Market Services

By Toni Wiseman
Of the CW Staff

LOS ANGELES – Electronic funds transfer (EFT) is becoming more of a daily routine for shoppers here.

California Federal Savings and Loan Association has been authorized by the Federal Home Loan Bank Board to install remote service units (RSUs) in as many as 154 Von's Grocery Co. and Hughes Markets, Inc. supermarkets.

California Federal is currently operating a single RSU at each of seven Von's and four Hughes markets in the Los Angeles metropolitan area, enabling bank customers to deposit funds into their savings accounts, make withdrawals and cash checks.

Expansion to seven more stores is planned for this year, according to Bob Weber, California Federal vice-president.

The operation centers around Addressograph-Multigraph Amcat 1 and Amcat 3 terminals hooked up to a Digital Computer Controls, Inc. (DCC) minicomputer front end.

The DCC mini is connected to a Univac 494 which operates as the host CPU, Weber said.

Additional Services

The federal loan board's approval will make it possible for California Federal to offer a number of additional services through the RSUs, Weber noted. These include direct payment for supermarket purchases, payment of utility bills, purchase of money orders and acceptance of loan payments from California Federal borrowers.

Currently, however, the only new service is direct payment for groceries; the amount of the customer's supermarket purchase is deducted from his savings account and transferred to the market's account, Weber said.

Lessens Stores' Risks

The grocery stores are enthusiastic about the program since it reduces both their risk and the amount of cash they must keep on hand, Weber said.

Under the conventional check-cashing system used by many stores in which each chain issues its own courtesy card, the supermarket is liable for bad checks, he said. California Federal now takes that risk.

In terms of cash flow, most supermarkets today cash checks equal to the amount of their sales, he said. But with the California Federal scheme, there is a reduced need for cash since customers can simply deposit their pay checks at the terminal and debit their accounts for their grocery purchases.

California Federal customers who want to use the supermarket RSUs must open a special "California Money" savings account. It is basically an "electronic transaction account," Weber said, or a statement rather than passbook type of account.

Money Card Used

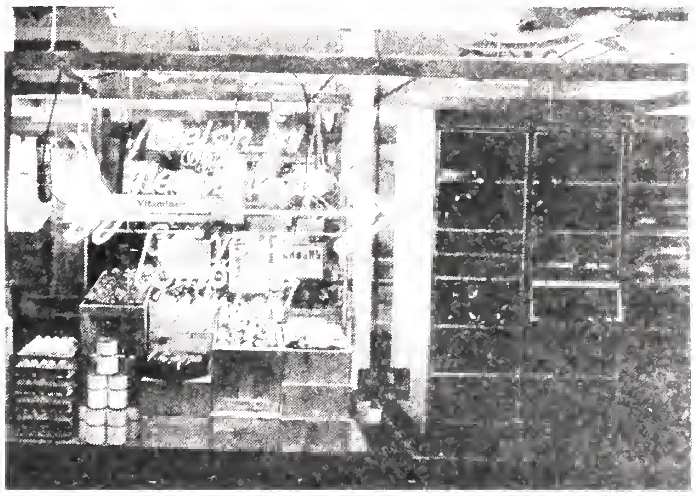
To date, each of the participating Von's and Hughes markets are equipped with a single RSU which is located at either the customer service desk or the liquor department. In the next phase, however, two of the seven markets involved will have RSUs at every checkout stand.

To use the system, a California Federal customer first presents his plastic California Money card to the supermarket employee operating the RSU. If he is making a deposit or withdrawal, the customer fills out a form similar to a credit card receipt.

The supermarket employee inserts the card and form into the RSU and presses the appropriate keys on the Amcat keyboard, recording the transaction on both the form and at the California Federal computer.

To ensure confidentiality for all transactions, the plastic card is magnetically encoded with the customer's account number and the name of the branch where the account is maintained.

In addition, to complete a transaction, the customer must key in his personal identification number through a small keyboard directly in front of him. The number consists of a four-digit or four-letter code selected by and known only to the customer.



Thought for Food

CHICAGO – Visitors to the "Food For Life" exhibit at the Museum of Science and Industry here can find out their recommended daily allowances (RDA) of vitamins, proteins and minerals with the help of a minicomputer.

One of the exhibit sections features menu selection. A glass-enclosed cabinet is equipped with rotating trays of food from which a visitor makes a selection. After the entire meal has been chosen, the mini analyzes the meal's nutritional value; data on how the meal meets the RDA required by the individual is displayed on a CRT.

System hardware consists of a 64K Digital Equipment Corp. PDP-11/40 and two RK05 disks for additional data storage. There are nine 16-digit keypads and 11 CRTs throughout the display area.

TI Security Based on Voice Verification

By Catherine Arnst
Of the CW Staff

BOSTON A security system using voice verification has been in use for the past year and a half at Texas Instruments, Inc. (TI) in Dallas, Texas.

It is "the first completely automatic system based upon a personal attribute to provide high operational security," TI's Dr. George R. Doddington claimed at a recent conference here.

Verification is based on a four-word utterance randomly selected from a set of 16 monosyllabic words. A sequential decision strategy is used which requires one to four utterances for verification.

The average number of utterances required is 1.35 and the average verification time is 5.6 seconds, which includes both voice prompting and user response, Doddington noted.

There are three major sources of verification errors when using a voice identity system – variations in speech by the same speaker, similarities in the speech of different speakers and problems in measurement, comparison and time registration, Doddington said.

To overcome these problems, each verification system user at TI must generate reference speech data and parameter estimates during an enrollment session, which also accustoms the speaker to the verification procedures.

Five sets of utterances are required in the enrollment session. The first set is used to define initial reference patterns for each of the 16 words and the remaining four replications of each word are used to refine the speech reference data and to estimate speaker parameters, Doddington said.

"A trade-off will often be necessary between verification performance and verification time," he added.

Seven components comprise TI's speaker verification system. They include an identification keyboard or badge readers to identify the user and select the correct speech reference file; an 8-bit digital-to-analog converter for voice response which gives instructions to the user, a microphone and digital filter bank to provide the frequency analysis of the speech signal; a minicomputer which provides all speaker verification and system control functions; a moving-head disk for speech reference data storage; a control teleprinter for operator interaction; and a control line/sense line interface which enforces the verification decision and fully automates the entry control.

Entry to TI's Corporate Information Center is controlled by a 4-foor by 5-foot booth whose doors are monitored and controlled by computer. The verification terminal in the control booth includes both a microphone and a badge reader.

The entire floor of the booth also serves as a weight scale and, during the verification process, the weight of each user is recorded along with his speech data.

Initial user acceptance of the verification system was gained gradually over a two- to three-month period, Doddington said.

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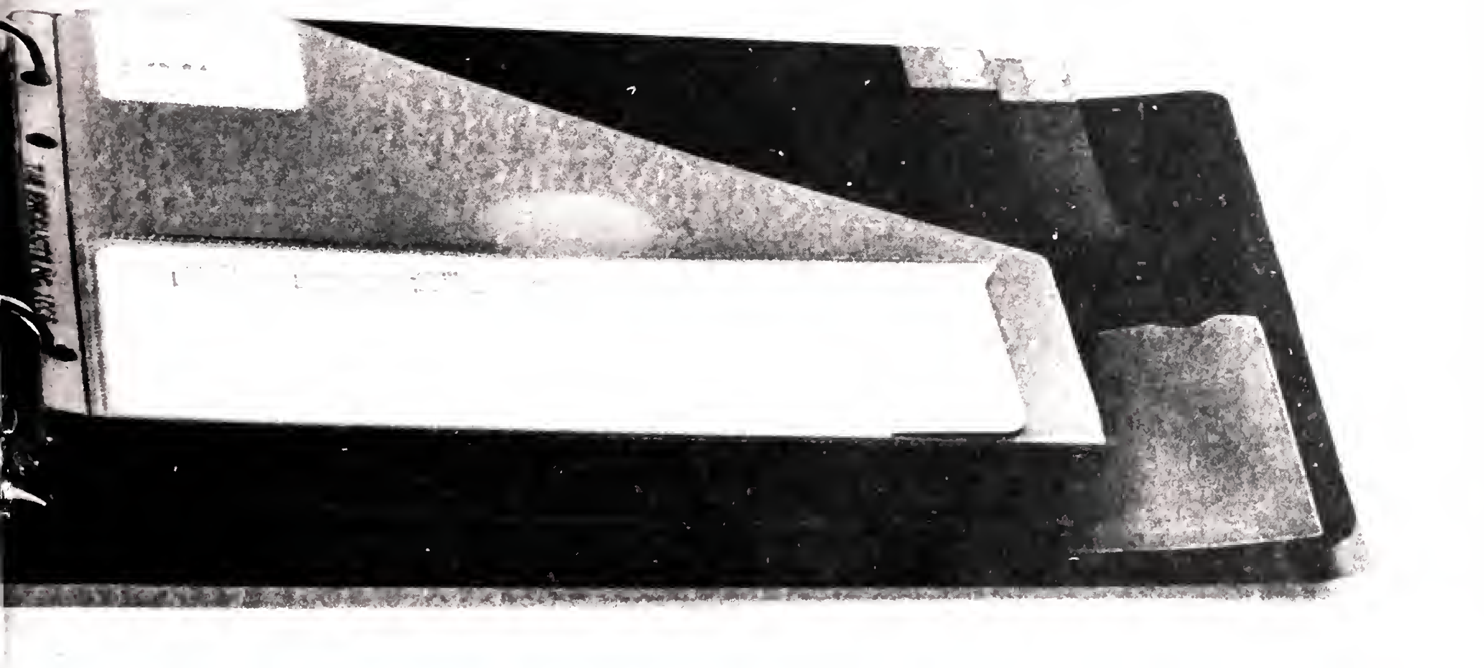

Widespread Use Still in Future

Chicago Schools' Success With CAI Doesn't Alter View

J. Daniel Couger On *Education*

In response to my column on the disappointing cost of computer-assisted instruction (CAI) [CW, Jan. 12], I received a letter describing the approach used by the Chicago public school system. It's providing good results and will be summarized below. After you've read about the Chicago system, we'll decide if it proves the cost-effectiveness of CAI.

In his letter, Lawrence Rosenthal, director of the Bureau of Computer-Based Instructional Systems, explained the Chicago public schools have been operating a CAI program for elementary school students since 1971.

The curricular areas serviced include reading, language arts and mathematics. The program is funded by ESEA Title I and is directed toward drill-and-practice learning experiences for students who are underachievers in reading.

Chicago began its program with 105 CRTs and seven printing terminals located in seven elementary schools. The program now includes 53 elementary schools which are equipped with 15 CRTs and one printing terminal. Students interact with the system on a daily basis via the CRT devices.

The printing terminals are used to produce student progress reports for teachers and to permit teacher aides to perform registration and other housekeeping activities related to the program. Terminals are multiplexed over high-speed telephone lines and connected to a single central computer system located in the Department of Systems Analysis and Data Processing.

The operating cost for this program is $43/year per student per curriculum, according to Rosenthal. Students receive drill work in reading and one other curriculum area. The second curriculum area is determined by the classroom teacher and is based upon the greatest need of the student.

The $43/year cost includes not only the hardware, but also the salaries of staff involved in the program and one paraprofessional who is assigned to each school. This represents the total operating cost with the exception of lighting and air conditioning.

In his letter, Rosenthal questioned my earlier statements about the cost-effectiveness of CAI:

"I believe your conclusion that instruction via computer will not be feasible until the early 1980s is not justified because it appears to be based upon a review of two applications, the Plato and Ticcit systems.

"Our experience in Chicago and in other school districts has, in fact, made CAI an operational reality at the elementary and secondary levels of education."

How Good Impact?

The natural question arising from Rosenthal's letter is, "What is the impact?" Students are on the terminal only 20 minutes daily, according to Ritta Cooney, Rosenthal's assistant.

In addition, less than one quarter of the students in each school (only grades 4 through 8) have access to the system. Nor were development costs included in the $43 figure.

The principles in developing the Chicago CAI system are to be commended. It's a good start.

However, the Chicago approach does not warrant a change in the views stated in my earlier column discussing the costs of Plato and Ticcit: "One must conclude that it will be at least the early 1980s before *primary* instruction is feasible."

Perhaps Rosenthal interpreted "primary" to mean "basic" type of instruction. It was originally intended to mean "principal."

After six years of operation, only 20 minutes of a full training schedule are provided by CAI in the Chicago system.

I'm not happy with my conclusion, but it still appears accurate.

Couger is professor of computer and management science at the University of Colorado.

Rutgers Researchers Using 360/67 To Study Role of Saints in History

By Ann Dooley
Of the CW Staff

NEW BRUNSWICK, N.J. – The saints are marching in here – to the tune of a computer which is being used to examine the role of saints in history, according to Dr. Donald Weinstein and Dr. Rudolph Bell of Rutgers University.

Using an IBM 360/67 for statistical analysis and data retrieval, information on 680 saints is being used to study "patterns of variation and changes of saintly origins, activity and reputation," Weinstein said.

Weinstein's and Bell's work, which they expect will continue for several years, will study 50% of the saints canonized or beatified by the Catholic Church between 1000 A.D. and 1700 A.D., or from the Middle Ages to the Counter-Reformation.

They plan to study 1,500 saints. As historians, they are not questioning the accuracy or the belief in saints, they said, but instead are studying the saints' lives within a broad social context.

The idea consists of categories such as birth, social background, early influences and basis for reputation of saintliness, such as preaching, helping the poor, founding of religious movements, miracle working, martyrdom and signs and miracles during and after death.

Coded Variables

The material is coded using 65 variables. Under the code word of MARRIED, for example, 0 was assigned to "never married," 1 to "married twice" and 8 to "never married, but had children."

Some codes were more difficult to assign values to because of their vague meanings, the researchers said. These included "influence of visions," or VISINFL.

Codes like AFTADEAD (miracles immediately after death) and SELFMORT as "big promoter of flagellants" became fairly arbitrary because of their vague accounts, according to Bell.

At one point, an appendage to the breakdown of data about one saint was discovered to have read, "I wish we had a separate category for leper kissers."

By correlating the attributes of saintliness, such as visions, it can be shown how important each was to the saint and to the society of the time, according to Weinstein. Through the use of the 360/67, information about one aspect of the material – such as characteristics about women saints – can be accumulated quickly, he added.

Role Models

By examining a community's perceptions of saints, Weinstein and Bell hope to prove saints were used as role models and innovators of social change and not just as a reflection of the current societal views.

"The cult of saints seems to us a marvelous index of changes in popular piety, and it enables us to relate changes in religious practices to changes in society," Weinstein said.

Some of the saints which they have examined are Thomas Becket, Anthony of Padua, St. Margaret of Scotland and Francis of Assisi.

AAA Offering Mediation In Contract Disputes

NEW YORK – In an effort to get technology-based disputes out of the courts, the American Arbitration Association (AAA) is offering its services to help resolve the growing number of contractual disagreements between computer equipment and services vendors and their customers.

Arbitration, which involves settlement of a dispute through the mediation of an impartial third party, is an American tradition that dates back to the settlement of George Washington's will, according to an AAA spokesman.

A nonprofit organization, the AAA does its work by calling in panels of experts to help the parties sort out issues and prioritize demands in commercial disagreements of all kinds, he said.

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Editorials

Dealing With a Reality

The recent International Conference on Computer Communication in Toronto demonstrated that a multinational common user data communications network is a technical reality.

But as the accessibility to data is being regulated in individual countries, the new and perhaps greater threat of international unauthorized access has reared its ugly head. The business community has become graphically aware of multinational corporations that operate just beyond the law of any nation to violate the laws of many nations.

A similar threat now exists from data pirates who literally "commandeer" data in midstream and manipulate it for their private gain in an extraterritorial data haven.

It is doubtful that data communications users can wait for international legal conventions to safeguard their transmissions. Existing copyright and other international agreements took many years to evolve and still are not subscribed to in a uniform manner by all nations.

The user will have to be aware his data is subject to compromise. The steps necessary to guard against such compromise may become more technically complex on an international scale when data is transmitted over multiple public packet-switched nets or via multiple-hop satellite links.

Hopefully the transnational common carriers will work with users to develop a system of uniform safeguards to protect the integrity of data that will soon be traveling around the world.

The carriers may have their own political motives on the types of services to be provided to users and the amount of control put in the hands of customers. But these same carriers have a good record of "carrying the mail" once they decide to provide a service.

Carriers and users may offer the best alliance against the potential data pirate who embarks on intentional misuse of sensitive information. Perhaps the groundwork for beginning such a dialogue could be instituted during the International Federation of Information Processing (Ifip) congress next year in Toronto.

Making the Connection

Over the years, and quite regularly over the past few months, we have tried to cover the nonhardware/nonsoftware aspects of a DP installation.

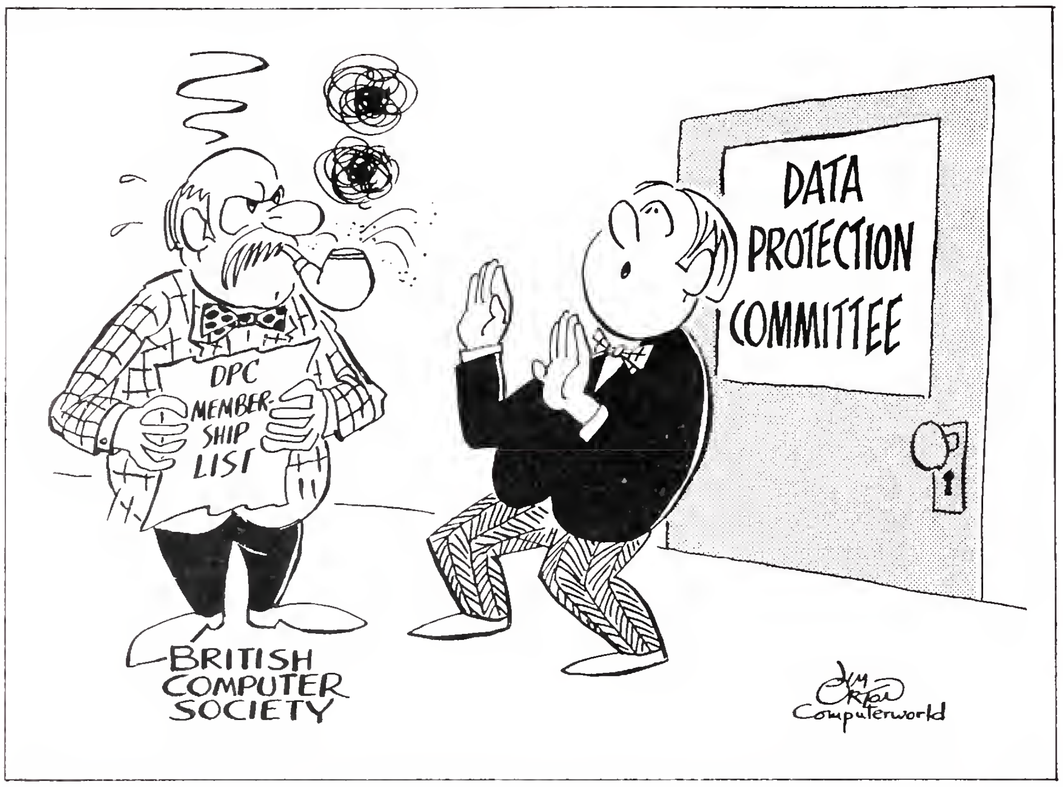
Our recent use of the term "Peopleware" came close to suggesting what we wanted to cover but many – ourselves included – weren't really happy with that label. The word itself seemed to dehumanize exactly that part of the DP scene we wanted to personalize.

With this issue we recognize, finally, that "The Human Connection" is, very simply, what we want to highlight. And so, on page 17, we've started using that label on articles related to the people involved in DP systems.

We want to focus on ideas, tools and events linked to selecting, training, career pathing, motivating and managing people with an eye to improving their efficiency, effectiveness and attitudes. This week's issue includes the first of Jack Stone's columns based on letters from readers.

In later weeks we will add coverage of seminars, training products, profiles of how users manage their personnel and what personnel think of that management as well as reports of discussions at technical conferences.

Reader contributions – leads, complete articles, reactions to previous stories, anything related to people within DP – are welcomed.



'Of Course We Didn't Pick Our Members at Random – We Might Have Inadvertently Selected a Computer *Person!'*

Letters to the Editor

Government PV Formula Assumes Income Equal to Cost to Borrow

Regarding Jerome G. Ganci's letter [CW, July 26] on the article "Using Government Formula Helps Dealers Set Prices" [CW, June 7], the present-value (PV) method of analysis assumes capital spent will be used to produce income at a rate equal to, not higher than, the cost to borrow.

Whether the funds are acquired from internal or external sources is immaterial to the analysis. No matter what the source, there is a cost associated with the acquisition of capital. This cost is either explicitly or implicitly recognized.

If the funds are from external sources, there is an explicit cost in the interest rate. If they are internally generated funds, the costs are associated with delaying the return of the capital to the residual owners.

The argument that "the government is not in the business of making profit, (therefore) its internal rate of return must be negative" was fallacious. The government *is* in the business of making a "profit." But this profit is not the profit of the marketplace; it is the "profit" of the public-service sector.

The economics of the public-service sector are different from the economics of the marketplace, but this does not necessarily repudiate the usefulness of PV analysis.

While Ganci's comment that the PV analysis method outlined in the article "was naive and bordered on the incompetent" may be true, the method is certainly better than totally ignoring the time value of money. It is at least a start toward a more sophisticated financial analysis.

Richard Courcy

Norwich, Conn.

PV Criteria Not Misleading

The government evaluation criteria is not as complicated or misleading as Jerome G. Ganci implied in his letter to the editor of July 26. As Ganci explained, using the present-value (PV) method only implies that money now is worth more than money later. He then tried to show how this "law of nature" does not apply to a nonprofit organization or, more specifically, a governmental agency.

Let's look at the relevant economics. Suppose Project A and Project B have the same dollar cost and offer the same benefits, but A must be paid for in cash today, while B can be paid for 10 years from today.

How could a nonprofit organization or governmental agency benefit by choosing Project A?

Charles Gille

Santa Barbara, Calif.

Is Obesity the Waiter's Fault?

In the July 26 article, "Blame for Steve Karagianis' Death On Our Shoulders," Kenniston W. Lord Jr. blamed the DP industry for the death of a suicidal young man.

I submit that temporary confinement, especially in light of one's own knowledge of innocence, is no reason to kill oneself. The data processing industry is no more responsible for that death than waiters in a restaurant are responsible for obesity.

Barry M. Chasen

Columbia, Md.

Data Past

Eight Years Ago
Aug. 21, 1968

LACKAWANNA, N.Y. – A petition filed with the National Labor Relations Board (NLRB) by the United Steel Workers of America asked to have 18 programmers and systems analysts at a Bethlehem Steel Corp. plant here ruled as clerical workers and included in the union's clerical unit. NLRB concluded the DP personnel could not be grouped in such a manner because of differences in job function.

– – –

CAMBRIDGE, Mass. – B.F. Skinner, the patron saint of programmed instruction, went on record to say computers were just a fad as teaching devices. Discussing the matter with *Forbes* interviewers, he said: "Setting up a computer to teach children is just idiotic" and that a "simple programmed workbook will do what the computer can do at one-tenth the cost."

Five Years Ago
Aug. 25, 1971

WASHINGTON, D.C. – A price freeze instituted by President Richard Nixon was seen as a boon to computer users. However, it had a negative impact on users planning to buy foreign-made units or equipment manufactured by overseas divisions of U.S. firms.

– – –

NEW YORK – A committee of top executives representing grocery manufacturers, wholesalers and retailers concluded it was feasible to develop a standard system for identifying grocery items – the Universal Product Code (UPC). Analyses prepared for the committee by McKinsey & Co. indicated the benefits of automated checkstands would outweigh the costs by more than $100 million annually.

An Open Letter

The Honorable Jack Brooks
House of Representatives
Washington, D.C. 20515

Dear Jack,

Wish I could have been at your hearings! Not only do I remember vividly where the body is buried but I reluctantly cast a few shovelfuls on the breast of the shrivelled corpse myself. This letter will be too late to get into your documentation — if I thought it could I would write more formally and at greater length — but perhaps it will help you shape your own thinking if you later propose legislation or urge action on the standards community.

I assume you were asking, as you have so many times before, why DP standards come along so slowly, why neither the manufacturers nor the user community pay much attention to them anyhow, and why the Brooks Bill hasn't produced much improvement in Federal computing and data processing. There are a dozen major reasons; let me focus on just two, which in my personal view outweigh the others.

First, an external matter: national organization. The American National Standards Institute is a poor thing — poorly managed, poorly funded, poorly connected to national economic and technical policy, and putty in the hands of industry. Our DP standards are in bondage to their sponsor, the Computer and Business Equipment Manufacturers Association — a classical case of setting the fox to watch the chickens. Each member of CBEMA, and notably IBM, is enthusiastic about those practices, proposed and *de facto* standards, and finished standards, which help in the marketplace, and does everything it can to discourage, delay and pervert all those which hurt. Thus, when I was at the Bureau of Standards, Honeywell wanted to delay the ASCII interchange code until it was ready to announce byte-oriented equipment, and IBM opposed the character set and code entirely, since it had a proprietary one.

This is natural, Jack; it's how our country works, and I'm not calling for altruism instead of competition. But it is sheer folly to place the coordinating mechanism, the standards sponsorship, in such hands. The DP standards sponsor ought to be above the battle, or at least user-dominated. The obvious candidate is AFIPS, the federation of professional societies. But CBEMA must put several hundred thousand dollars a year into standards work: salaries, overhead, travel, publications. And that doesn't count the indirect support of many other organizations, including NBS and ACM.

If industrial memberships in the DP standards work required a stiff annual fee (as membership in CBEMA does now), sponsorship other than CBEMA becomes practical: could be a special institute, could be AFIPS or one of the AFIPS societies. The subvention has to be enough to support a sizable paid staff; volunteers are ruled out, since they would have primary loyalties elsewhere — to UNIVAC or MIT or the Bank of America.

Moreover, committee work ought to be partially funded. Where a volunteer needs travel money or secretarial services, and cannot get them even with strings attached from his or her employer, the committee or subcommittee ought to be able to offer support. I wish ACM could do this for its standards workers; at the moment, we find it too expensive, and have just lost a knowledgeable chairman in consequence.

So much for that; I could go on at much greater length, but the point is made. Now, about an internal problem: the National Bureau of Standards. The "dirty secret" at NBS is in fact an open one, and I believe you already know it. The Bureau regards itself as a research laboratory of physics and chemistry — an attitude mirrored overseas by the corresponding outfit in Britain, the National Physical Laboratory. It undertakes assignments in the standards area — whether about the compressive strength of concrete or the requirements of a COBOL compiler — with reluctance bordering on distaste. When Lew Branscomb removed me as director of the NBS computer activity, he told me bluntly that it was the job of the Bureau and its components only to create and refine methods of measurement (computer performance, for instance, or the magnetic properties of storage media). Others, he said, should set requirements and talk about cost effectiveness. I countered that the Brooks Bill made NBS the technical representative of the largest computer *consumer* in the world, the U.S. Government, and that I had been hired by his predecessor to direct precisely that effort. I told him that in determining to advise the Federal procurement people not to acquire any System/3s, I had done the required laboratory work — personally, that is. I had counted the columns on the new card! Crunch!

I do not believe it is possible to change the deep motivations of The Old Bureau by much. Nor do I believe the General Services Administration can be trusted to do highly technical work; they seem hard put to it to keep elevators and car pools going. You are trying to improve operations, across the civilian and military agencies, which cost well over $5 billion a year; would it be out of the question to set up an entirely independent bureau, or one combined with the equally costly and equally technical work the Federal establishment needs in telecommunications? It could still be in Commerce, although sooner or later you are surely going to have to come to a Department of Science and Technology or something of the sort.

Jack, you're right: this *is* worth doing. The Feds could deliver better work, and save a billion bucks a year besides. And standards, along with clever procurement and improved personnel practices, could do it. But you're going to have to get CBEMA and NBS out of the way first.

Herb Grosch

Model Pinpoints Total Cost to Implement Privacy Act

The Privacy Act of 1974 has two major areas. One is the payload area — requiring safeguards to be used to see that information is correct, kept secure and distributed only to proper recipients. This deals with the computer records themselves. The other area of the Privacy Act is the overhead area — Subsection e(5) which requires holders of data banks to keep records showing what has been going on with the data in the bank.

The Taylor Report

By

Alan Taylor, CDP

The cost of all this has been one of the most hotly contested areas in the privacy arena. No one likes adding costs to anything, and few people are able to estimate intuitively just what the cost of either the actual privacy or the recordkeeping requirement really is.

Now there is an estimating method. A computer model has been developed which breaks down the costs in a standard manner, based upon the answers provided to some 80 questions. The model itself (NBSIR 76-985) was developed by Robert Goldstein and Henry Seward, both of DP Management Corp. in Lexington, Mass., and is available from the National Bureau of Standards (NBS).

The model works through the various compliance steps — 17 in all. Step 15, for instance, deals with the training requirement. Training programs have to be given both to the data base owner's employees and to user groups.

The model breaks these programs down into nonrecurring and recurring refresher training, and then further into four quantities — initial training, management preparation for both the internal initial training and the giving of classes to outsiders, recurring training and refresher outsider training.

The actual training computations are quite simple. Here is the complete program:

```
QUAN(18,3) = NCLK*HTRC
QUAN(18,2) =
                  /(NCLK*HTRC +
            NUSR*HTRU)/SCLS
QUAN(18,14) =
                FTR*QUAN(18,3)
QUAN(18,13) =
                FTR*QUAN(18,2)
```

where:

HTRC is the number of class hours required to train clerical personnel.

NCLK is the number of clerks involved in running the system.

HTRC is the number of class hours training required for clerical personnel.

NUSR is the number of potential users of the system.

HTRU is the hours training system users needed.

SCLS is the size of the training class.

FTR is the frequency of training.

The values for some of these are obtained from questions 10, 12, 58, 59. These give NUSR, NCLK, HTRC and HTRU.

The model provides the more variable information such as FTR and SCLS. This makes it possible to select from various possibilities to determine which approach seems most appropriate for particular situations.

If, for instance, you had the results shown in Table 1 for your own system, showing that 24% of the cost was in answering questions about the existence of records, you might want to check what the cost would be to notify everyone of the existence of their records.

Then again, looking at the results from another firm (although firms are not covered by the legislation, a number of them are studying the problem and implementing many equivalent measures already), one might find the percentages for data accuracy (30%) and answering queries for record existence (24%) were not the two highest percentages, but that maintaining the usage log and retroactive claim dissemination were where the money was going. That would immediately focus attention on better, more economical ways to handle data banks

In fact, we have to realize we are in a transition period. The basic decisions with regard to data base design were made in the prelegislated privacy era. Now that that era has opened we have to explore a great many possibilities in searching for the most economical compliance method both this year and in the future. Availability of the model economically, and the availability of NBS as a depository of information about how things are going is an excellent start.

```
                                      Conversion           Annual
 Compliance Technique                     Totals           Totals
 Data Supply Oblig Notif           $  111.(15%)    $       0.(0%)
 Usage Authorization               $     14.(1%)   $      95.(5%)
 Usage Log Maintenance             $    80.(10%)   $      37.(2%)
 Record Existence Inq              $      2.(0%)   $   383.(24%)
 Record Usage Inq                  $      0.(0%)   $    118.(7%)
 Data Accuracy                     $      1.(0%)   $   480.(30%)
 Additional Data                   $      0.(0%)   $       5(0%)
 Data Accuracy Inquiries           $      0.(0%)   $   270.(16%)
 Subject Claim Storage             $      0.(0%)   $       3.(0%)
 Subject Claim Dissem              $     68.(9%)   $      17.(1%)
 Retro Claim Dissem                $      0.(0%)   $      12.(0%)
 Legal Process Notif               $      0.(0%)   $       0.(0%)
 Physical Security                 $   124.(16%)   $      78.(4%)
 User Training                     $   312.(42%)   $      62.(3%)
 System Assurance                  $     20.(2%)   $      29.(1%)
 Public Notice                     $      0.(0%)   $       1.(0%)
 ***Totals***                      $        732    $       1,590
```

The report shown illustrates one of the main outputs of the model. The figures are realistic, according to one of the authors of the model, Dr. Henry Seward, although in the interest of privacy they are not found in any actual live use of the model. All figures are rounded down and given in thousands of dollars.

In Terms of Cost-Effectiveness

Integrating Documentation, Education Seen Beneficial

By Joseph A. Komar

Special to Computerworld

Most people would agree the purpose of documentation is to communicate. However, to really understand the purpose of documentation, we must ask, "Why do we want to communicate?"

The answer should be that we intend people to act in a certain way – in other words, we want programmers to efficiently maintain the system, operators to operate the system successfully, users to use the system correctly.

Our ultimate objective must be in terms of the desired end result, otherwise, there really is no purpose to documentation. We cannot just communicate, we must communicate for a reason.

Documentation was originally written by programmers and analysts so the systems designed would be able to be used and maintained by others. It soon became clear there was a great deal of documentation required and this effort transformed programmers and analysts into journalists.

Therefore, most larger DP shops employ technical writers to assist in writing this vast amount of documentation.

In addition to the documentation produced, education programs were also developed. The training is usually user-oriented although, in some cases, there is also a need to train programmers, analysts and operators.

Many times this training entails little more than the lead analyst standing up in front of a group doing a "show-and-tell" presentation of the system. Again, the ultimate purpose is the same as for documentation – to have people act or behave in a desired way.

Ultimate Objectives Similar

Is documentation, therefore, different from education if both have the same ultimate objective of behavior modification? No! There is really no difference if we look at desired results.

It can be argued there is a difference in form because documentation is written and training is "live," but this is a cosmetic difference and does not change the fact that they are identical in purpose.

Unfortunately, this identity of purpose is often not recognized or soon forgotten. This leads to a disjointed and redundant effort in the development of documentation and education. The documentation is written by technical writers and the education is developed by the lead analyst or the training department.

Reader Commentary

Any integration of these two efforts is all too often accidental. In some cases there is overlap in effort – the instructor reads the documentation in class – and in many cases there are critical areas left uncovered in both the education and the documentation.

At one extreme we've spent excess time and money, and at the other we've run the risk of not accomplishing our ultimate goals.

Necessary Steps

What is needed is an integrated, comprehensive application of educational principles to both documentation and education. We need to recognize our ultimate goal and then proceed through the following steps.

- *Define the audience.* Whose behaviors are we attempting to change – users, programmers, operators, customers?

In addition, what are the characteristics of each of these groups? Are the users managers, executives or clerks? Are the programmers entry-level, applications or systems?

This step will define whose behavior we need to change and may provide convenient categories for development of materials.

- *Specify desired behaviors.* We should begin with the desired ultimate behavior e.g., successful system operation – and work backward identifying each of the specific behaviors required to achieve the ultimate objective.

We will also be able to sort and sequence sets of objectives into logical wholes that will serve as a unit of learning.

- *Design and develop.* Once the audience and units are defined, it is possible to select the appropriate form of presentation.

For example, complex materials might be best presented in a classroom situation supplemented by written materials; motivational aspects might be best handled through lecture/discussion; detailed but simple material is best presented through printed matter; audio/visual materials can be effectively used for a variety of purposes.

There is a wide variety of trade-offs to be made in terms of costs, schedules, resources available, geography and number of individuals in the audience population. The materials developed will, however, provide a cost-effective mixture from among the infinite number of possibilities.

- *Test.* Since the objectives are stated in terms of desired behaviors, the materials are easily tested. For example, is the individual able to perform the functions desired after reading the user manual?

Testing is necessary, but is too often forgotten. A good test will greatly enhance all the materials developed.

Worth the Effort?

There is little doubt that an integrated approach to documentation and education will provide a much more cohesive, effective set of materials and methods. The question is, is it worth it?

In this author's experience, it has been extremely cost-effective. By developing a user manual that also teaches and providing a seminar to supplement and give practice, users can quickly learn how to use a software package and apply it to their day-to-day work.

Take a look at your training budget and add to it what documentation costs to develop. Are you getting the maximum effect from both? Would you get a greater effect by combining these efforts?

Consider the following potential benefits you might be missing: reduced instructor based training, reduced travel expenses for training, increased user confidence, systems that can more easily be maintained and fewer operational problems.

The consistent application of educational principles to *both* training and documentation can easily be accomplished and will provide maximum effect for minimum dollars. Consider putting together an "Edudoc Department" to make potential benefits actual benefits.

Komar is president of Komar and Associates in Burnsville, Minn.

Snobol 68: A Thing of Beauty, But No Help to Programmers

By Miles Benson

Special to Computerworld

Can a programming language be a failure?

Take Snobol 68, for example.

The academic world thinks it's the most well-defined, rigorous and crisp language ever invented. Its syntax snaps and its semantics crackle and pop. It has capability that hasn't even been used yet.

The Sociology of Computing

In fact, that's the problem. Hardly any of it has been used yet.

Implementors read the rigorous definition and turn away as if it had bad breath. Users read the less rigorous definition and scratch their heads in dandruff-disturbing swirls.

For all its esoteric beauty and to give the software devil its due pragmatic power. Snobol 68 reverberates with a dull thud in the total world of computing.

There is one implementation, on the UK 1900 (there'll always be an England), but one implementation doth not a groundswell of approval make.

The fact of the matter is, the documentation and the language are too complex for all but the finest of intellects. "Mind-boggling" might have been invented to describe Snobol 68.

So what, then, is a failure? If a language is a work of art, a Michelangelo's David among the more malformed Fortrans and Cobols and PL/Is of the world, is it a failure?

If a language is never used for the purpose it was designed for, to solve problems in the real world, is it a failure?

If a tree falls in the forest and no one is there to hear it, does it make a sound?

That's a set of questions I'm happy to duck. But they're fertile material for the next computing bull session you find yourself in.

erisa?

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WANG

Letters to the Editor

No More Favors, Please

With all due respect to James Vaughan's opinion on what would be good for existing and yet-to-be-created computer maintenance service companies [CW, Aug. 9], please don't do me any more favors like IBM did when it unbundled software and education from my systems rent.

This might benefit the DP division installations, but to price maintenance separately from rent is only going to cost me money and give me nothing.

To illustrate my point: My installation is located in the east-central part of northern Indiana, three hours from Chicago, two hours from Indianapolis, one hour from Ft. Wayne and two miles from my IBM customer engineer's house. Current cost for maintenance of my system (an IBM 3/8, 3741 and 3742) if purchased is about $500/mo (1 lease).

Can any maintenance house match this service for less cost? I doubt it.

IBM, if forced to unbundle leased maintenance, will not be giving its service away and in fact will probably raise the cost of maintenance because of the additional expense of separate accounting.

David G. Nagel
DP Manager

Wabash Alloys, Inc.
Wabash, Ind.

No Way to Measure Skill

Nor Jones may have had a valid objection that testing will not validate the degree of skill one may have in a particular area [CW, July 26], but until someone devises a workable technique of measuring skill, we must continue to measure the knowledge of the person in question.

After reading several articles in *Computerworld* about certification, most of the criticism seems to be coming from those who are afraid to sit for a Certificate in Data Processing (CDP) or Registered Business Programmer (RBP) exam.

David L. Cole

Fort Worth, Texas

CICS Support Enhanced

CHICAGO – Qwik-Screen, a productivity aid from GMA Software, has been enhanced to support a wider range of IBM 360/370-based CICS users by including a Basic Mapping Support (BMS) option in addition to the "hard-coded" maps generated by earlier versions.

Now the user selects a mapping option (BMS macros or a hard-coded map) and a language option, "draws" his desired screen on the IBM 3270 or on the panel layout form, defines the field attribute character and enters the data name associated with each field, GMA said.

The hard-coded map option generates a documented Assembly language map and tables containing the length, buffer address, attributes and the address of the routine which processes the entry, a spokesman added.

The BMS option generates the DFHMDI and DFHMDF macros for both maps and DSECTS for Assembler, Cobol or PL/1 languages as specified by the user.

CATAL, BKEND and COPY statements are also created to aid the user in cataloging and retrieving the macros for assembly. The BMS option is supported by both on-line and batch versions of Qwik-Screen.

Qwik-Screen is available in object deck form on a license basis for a fee of $1,495 from CMA Software, 2946 N. Merrimac Ave., Chicago, Ill. 60634.

'Sara IV' Monitors MVS Sites, Work With SMF, MF1 Records

By Don Leavitt
Of the CW Staff

FALLS CHURCH, Va. – Boeing Computer Services, Inc. (BCS) has completely rewritten its System Analysis and Resource Accounting (Sara) system to support IBM's OS/VS2 Release 2 and 3 (MVS) operating systems, according to the company.

Sara IV was designed to provide visibility into the operational characteristics of MVS, to provide management control of the computing environment and to permit planning and projecting of new system requirements, a spokesman noted.

As with all the IBM-oriented Saras, the latest utilizes the data collected by IBM's System Management Facilities (SMF) as the basis for its reports. The rewrite leading to Sara IV was necessitated by the changes IBM made in SMF under MVS and in extensions in the reports BCS wanted to make available, he said.

IBM's changes to SMF include the deletion of Type 1 and 12 records which provided data on system wait time and paging activity, the institution of new CPU time fields; and different designation of memory requirements.

The introduction of Virtual I/O, data elements unique to MVS and the addition of so-called MF1 data the 70 series SMF records also provided additional sources of input for Sara, the spokesman said.

Given that type of change in its basic input data, Sara IV has been enhanced to report, for example, the MVS unique information. Service units, transaction times and their ratios are on all appropriate reports, the vendor said.

Special reports can be provided by the Sara report writer from the Type 70 series records to study CPU workload and device behavior. Other reports show activity by performance group, an essential in tuning the service unit algorithm used by the System Resource Managers, according to BCS.

The job software vector report provides data on the utilization by individual resource component on a job basis. This has application to the Software Physics approach to systems and workload analysis, the company explained.

The program utilization report provides a list of the top 10 programs in six resource utilization categories and assists in isolating critical programs. The device utilization report, typically the second page of all major Sara IV reports, displays data related to each of the Sara device groups, according to the spokesman.

All technical-level reports have improved statistical summaries showing totals, averages and standard deviations for all major variables, he added.

BCS also noted that data with up to 20 intervals can now be selected for plotting; new data including service unit and the Sara-calculated computer resource unit arrival rates are available under this enhancement, the spokesman pointed out.

Enhancing facilities already part of earlier Saras, Sara IV "external file" records have been changed to reflect the SMF-, MVS- and MF1-related data. In addition, exception reporting has been modified so job and step exception reports can be selected independently.

Sara IV is compatible with both Sara III and the Honeywell version (Sara-II) in terms of formats and interpretations. The MVS-oriented package is available for a license fee of $13,000 from BCS at Suite 217, 7777 Leesburg Pike, Falls Church, Va. 22043.

'Acts-11' Puts PDP-11 On-Line

WAYNE, N.J. – The Application Control and Teleprocessing System (Acts-11) from Worldwide Computer Services, Inc. (WCS) is a task monitor for use with Digital Equipment Corp.'s PDP-11/70 under DEC's RSX-11 executive.

The package allows the 11/70 user to implement on-line data base, data entry and message-switching systems formerly requiring more expensive, larger computer systems, WCS said.

Acts-11 provides a table-driven multitask environment for application programmers that is similar to IBM's CICS, Turnkey Systems' Taskmaster or Programming Methods' Intercomm, a spokesman suggested. Programs may be written in Fortran IV Plus or Macro-11 and may be serially reusable between Acts-11 subroutine calls, he said.

Acts-11 supports file accessing, terminal interfacing, storage management and task interfacing. Supplementing RSX-11, the WCS software provides intertask communications without data movement, protects the system from application programmer error and permits multiple use of tasks without undue overhead, the spokesman added.

Dynamic full storage addressability is supplied, with storage allocated from Acts-11 buffer pools – which can be used for task-related work areas as well as for intertask data. Thus, according to the vendor, the software increases throughput and decreases response times by reducing disk accessing and RSX node pool contention.

Other Acts-11 features include IBM 2260/3270 support with mapping, dual-access mirrored disk and tape with restart/recovery from both devices, a VT50 3270 simulator and an Acts-11 unit test driver for program development, WCS said.

Still other facilities include an addressable system common storage, an Acts-11 generated task word area, a resident and overlay task feature and support for exclusive read for update, including lock/unlock protection on data being updated, the spokesman added.

The basic Acts-11 system costs $25,000, which includes two months of installation and training at the user's site. WCS is at 177 Lake Drive West, Packanack Lake, Wayne, N.J. 07470.

D.C. Group Plans CPE Conference

LANHAM, Md. – The National Capital Area (NCA) regional group of the Computer Measurement Group, Inc. will conduct a day-long conference on computer performance evaluation (CPE) on Sept. 15 at the Ramada Inn here.

Guest speakers will be Dr. Thomas Bell of Peat Marwick, Mitchell & Co. and Barry Stevens, an independent consultant.

Since NCA is still in the formative stage, part of the morning will be devoted to progress reports of special interest groups and a presentation of proposed bylaws for the group.

The afternoon portion of the conference will consist of concurrent technical seminars with topics expected to cover all major computer manufacturers.

Registration fee is $10. Additional information is available from Robert P. Garrett, U.S. Army Military Personnel Center, Alexandria, Va.

'Caesar' Runs Time-Shared SPSS Chores

RICHMOND, Va. Taking a classic acronym for a new problem, the APL Services Division of The Computer Co. has introduced the Card Archive and Edit System for APL-RJF (Caesar) which it said allows the direct access, entry and editing of Statistical Package for the Social Sciences (SPSS) data from any on-line APL terminal.

SPSS was originally developed at the National Opinion Research Center, University of Chicago, in 1970. Since then it has been adapted to various machine/operating system environments by various organizations.

An enhanced version of SPSS is available through the national Action/APL.SV time-sharing facilities marketed by The Computer Co. With the SPSS/Caesar combination, users can now work with the SPSS control cards and system job control language in conversational mode, an APL Services Division spokeswoman noted.

In this environment, SPSS-printed output and raw data are returned to an APL file which the user may access whenever it is convenient. The data is also available for additional processing in time-sharing mode through the network's APL-based statistical library.

The data editing capabilities of SPSS/Caesar are as important as the easier control card preparation, the spokeswoman said, noting also that "certain unique requirements" of SPSS, such as correct column placement for control and specification fields, are "automatically fulfilled by Caesar."

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Mathematica Planning Release Of 'Ramis' in DOS/VS Version

PRINCETON, N.J. – A DOS/VS version of Ramis, the data base management system from Mathematica Products Group, Inc., will be released in the fourth quarter, according to the vendor. Expected to be operational on IBM 370/135 and larger mainframes, Ramis will support user application programs written in Cobol, Fortran or PL/I, Mathematica said.

A self-contained nonprocedural language that has been available with the OS/VS version of Ramis is expected, however, to be a mainstay of the DOS/VS users.

The capabilities of that language are said to include support for transaction processing, including file updates and report generation. Free-form English sentences can make up the basis of graphic as well as tabular reports, the company noted.

As a data base system, Ramis supports hierarchical file structures for "naturally describing the relationship" of data fields to one another, Mathematica said. The system also includes a runtime executive which permits the user to catalog often-repeated activities and the logical decisions the system is to make in response to actual operating conditions.

Under the OS and OS/VS versions, an interface was available for using the Ramis report writer with IBM's IMS files.

Costs were not immediately available, but earlier versions ranged from $28,000 to $55,000 depending on options chosen. The firm can be reached through P.O. Box 2392, Princeton, N.J. 08540.

OS Users to Meet Friday

NEW YORK – The Automated Space Management package from Cambridge Systems Group will be discussed at the Aug. 27 meeting here of the OS Eastern Region Systems Group (Oserg).

Users interested in attending can contact Oserg secretary Ruth Johnert at Home Insurance Co., 59 Maiden Lane, New York, N.Y. 10038.

Boole & Babbage Has 'TSA' for MVS Sites

SUNNYVALE, Calif. – Boole & Babbage, Inc. has introduced a version of the Total System Analyzer (TSA) package designed for the IBM MVS environment.

This version will enable users to concentrate optimization efforts in areas that will lead to the greatest CPU usage improvements, according to the vendor. TSA measures the CPU activity of all the system and application program modules. It reports this activity and SVC time for each module and relates this data to the job name which called the module, the vendor said.

Additional TSA reports help the user identify which instructions in the module were the high points of CPU activity. The package also produces plots over time of any module's use, a spokesman noted.

In effect, then, TSA identifies which modules are causing CPU bottlenecks, where the time is spent within the module and which specific job is using the module, he explained.

TSA for MVS is available for $13,000 from the firm at 850 Stewart Drive, Sunnyvale, Calif. 94086.

'Panvalet' Ready for CICS Users

OAK BROOK, Ill. – Pansophic Systems, Inc. has introduced Panvalet/On-Line, an extension of the Panvalet program management and security system that allows on-line edit and update of programs from IBM 3270 terminals through IBM's Customer Information Control System (CICS).

Panvalet is used to establish, maintain and protect a control library of source programs, JCL and card-image data files on a direct access device. By doing away with actual punched cards, the system saves clerical errors and vastly increases the speed of handling these basic DP chores, Pansophic said.

CICS is a terminal-handling system used on IBM 360/370 mainframes in both DOS and OS environments which permits on-line transaction processing initiated through terminal input.

The combination of these facilities in Panvalet/On-Line is said to refine the previously available Panvalet/CICS Option while maintaining the backup support, audit trails, protection and compression capabilities of the basic batch-oriented Panvalet.

Users of Panvalet/On-Line can build, add, delete or change member statements, replace character strings and move statements within a member from one member to another or from one library to another, according to Pansophic.

In addition to having immediate verification of any change shown at the terminal, the system also shows all changes on a hard-copy printout, a spokesman noted.

Panvalet/On-Line is currently available for OS data centers for $7,500. Current users of the CICS Option may acquire the On-Line feature for the difference in cost between the two products. OS Panvalet, required as the base of the On-Line facilities, now costs $5,850.

Panvalet/On-Line for DOS is due for fall release, the company added from 709 Enterprise Drive, Oak Brook, Ill. 60521.

Stoner Models Pipeline Flows

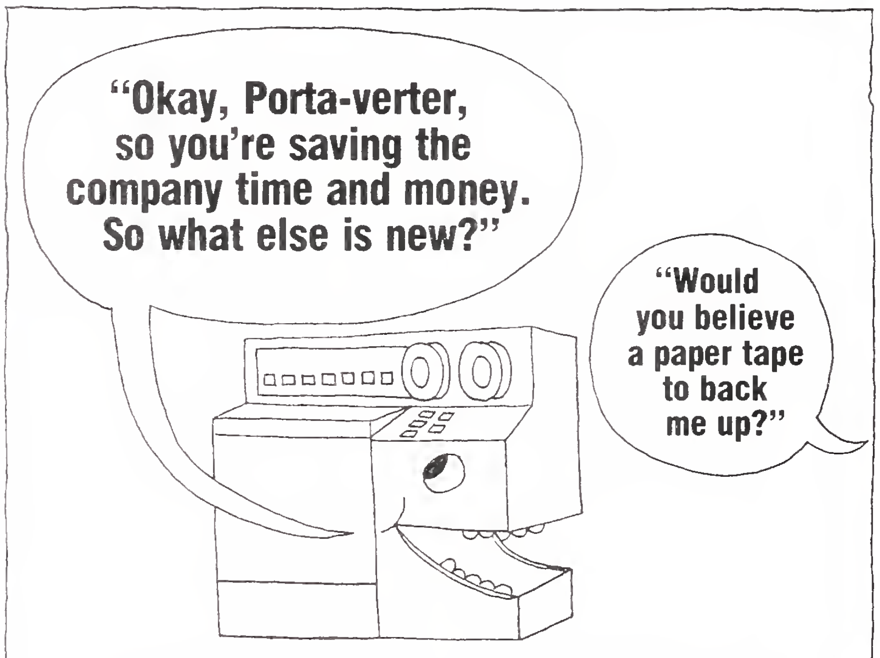
CARLISLE, Pa. – Four proprietary programs which model networks on both gas and liquid pipeline flows have been maintained and supported for several years on a commercial remote-computing network, according to the developer of the programs, Stoner Associates.

The capabilities of the programs are focused at liquids in a steady state, transient liquids and gas in either steady or unsteady states. They can be used by Stoner on behalf of a client or by the client directly through terminals.

In addition to the programs, Stoner offers a range of other services including engineering consulting, staff training sessions and seminars, gas dispatcher training, customized computer programs and support, a spokesman explained.

The company can be retained on a continuing basis or in response to a one-time need, he noted. Once use of the modeling programs has been made available to a client through a license arrangement, Stoner may even drop out of the picture altogether, he added.

The firm can be reached through P.O. Box 86, Carlisle, Pa. 17013.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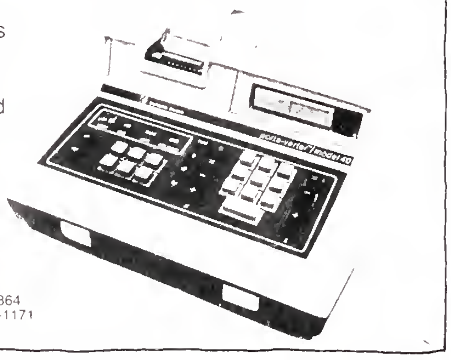

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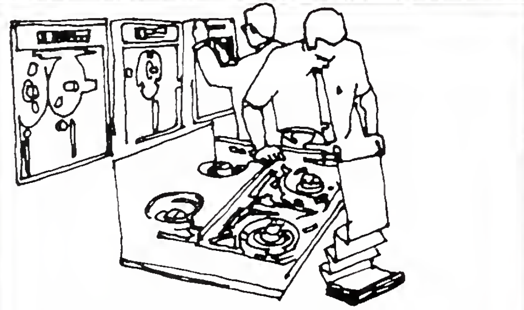

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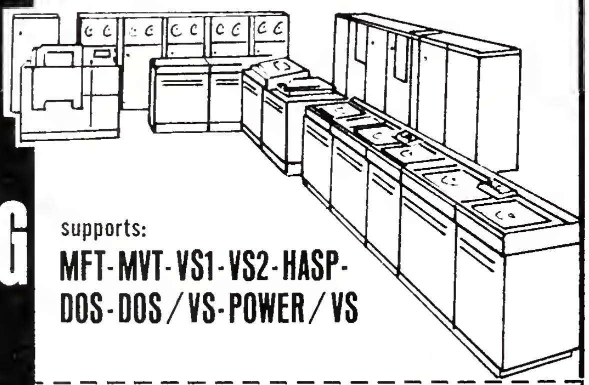

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Local Unit Seen Key to Union in White-Collar Shop

By Jack Stone
Special to Computerworld

This letter is from a husband and wife team of labor consultants. They report additional information regarding the extent of unionism in the DP industry [CW, June 21].

Dear Jack:

We read your piece on the challenge of unionism for DP managers with special interest. With a combined total of some 25 years in white-collar unions (Railway Clerks, Teachers and Office and Professional Employees), we thought it striking that the problems, advantages and disadvantages you outlined are valid for almost any white-collar working situation.

Although office employees (as opposed to factory workers) have been slow to recognize the advantages of being organized, recent activities among teachers and government workers have made the public increasingly aware that office people have the right to representation as well.

In his recent book, *White Collar Union*, Joseph E. Finley explained that "recruiting an office clerical group into unionism today usually involves a careful, finely tuned contest for the loyalties and consent of the work force, a much more sophisticated endeavor than winning over a band of rebellious factory workers."

Stone is interested in hearing from DP organizations that are now unionized or are planning union activities.

Readers are also invited to write to Stone, c/o Computer Education International, Inc., Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007, outlining questions, issues or situations pertinent to human relations and personnel management.

Selected letters will be published in Computerworld, *along with commentary by Stone, in this column.*

Letters should not exceed 500 words and should include the name, title, organization and address of the sender for acknowledgement purposes. This information will be treated as confidential and withheld from publication unless authorized for release by the sender.

He went on to say that, at the thought of committing themselves to a union, "they are filled with anxiety, hesitation, feelings of disloyalty to their bosses, uncertainty about what might happen to them."

Scare stories about activities in monolithic and tightly controlled unions like the Teamsters or some of the building trades have raised concern. Industry-wide bargaining or rigid union discipline is definitely not part of the white-collar scene.

In this case, the individual operating group is the usual "bargaining unit." This unit consists of the men and women in a single company or work place who elect their own officers, decide what issues to bargain about and negotiate a contract with management.

Since no far-away "union boss" is handing down the orders and since the elected representatives maintain constant contact with the people they represent, such thorny issues as promotion on the basis of seniority vs. competence, merit bonuses and the like can be hammered out in a way that seems fairest to the majority of the employees and is acceptable to management as well.

There was one small point in the article with which we would disagree. While a negotiated contract with the union can have the effect of changing erratic or arbitrary handling of management policies and programs into something that is orderly, planned and controlled, this does not always happen.

On the other hand, top management soon becomes aware if its middle management is being arbitrary and unfair in the face of a clearly worded contract. In the long run, the contract can work to everyone's benefit.

One major advantage to both management and individuals that you failed to mention is in the area of upward mobility. The skills required by a good programmer are quite different from those needed by a good manager.

Union activity, however, allows employees to exhibit political and human relations skills that would never ordinarily be noticed by management in the regular course of work. The airlines industry has taken advantage of this fact for years by promoting promising leaders of the Airline Clerks Union into the ranks of management.

A problem DP people may have is not knowing if there even is a union for them. The most generally appropriate organization is the Office of Professional Employees International Union (OPEIU). Its 100,000 members include 5,000 to 10,000 people in computer-related functions.

The American Federation of Government Employees, with jurisdiction over 300,000 people, and the American Federation of State, County and Municipal Employees, with jurisdiction over 750,000 workers, also represent a fair number of DP employees.

The Human Connection

As management policies and budgets continue to tighten under the impact of current economic conditions, working conditions will inevitably become more difficult, layoffs more frequent, in-house training less accessible and promotions slower.

Inevitable Impulse

In such a climate DP employees will inevitably agree with the president of OPEIU that "professionals are finding that the immediate supervisor or the individual in charge of personnel is not in any way competent to deal with their grievances." Under such conditions, the impulse to organize will also inevitably gain ground.

The big question is: Can management deal effectively with this challenge either by becoming sensitive to the conditions that cause unrest or (if their shop does organize) by accepting this development in a creative and positive fashion that will benefit everyone in the long run.

Lee & Bob Aikin
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Ed Yourdon and Jerry Weinberg will be examining these and other questions at five one-day State-of-the-Future Conferences in cities across the country the week of September 20th (see box below for dates).

Both of these dynamic thinkers have some very strong views on the subject.

Views that have been tempered by ten years of experience as leaders of the "structured revolution."

Yourdon is the author of *Techniques of Program Structure and Design* and *How to Manage Structured Programming*. And co-author of *Structured Design* and *Structured Programming in COBOL*.

Weinberg is the author of *The Psychology of Computer Programming* and *An Introduction to General Systems Thinking*.

State-of-the-Future Conference Dates

Washington	September 20th
New York	September 21st
Toronto	September 22nd
Dallas	September 23rd
San Francisco	September 24th

The conference will consist of four major presentations by Yourdon and Weinberg. There will be discussion periods after each session.

Each conference participant will receive a copy of Weinberg's *An Introduction to General Systems Thinking*, and Yourdon and Constantine's *Structured Design*.

Specifically, Jerry Weinberg will speak on *General Systems Design* — the discovery of the deep principles that will chart the course of future design. His second talk will revolve around the subject of *Responsive Design* — a philosophy of designing computer systems that adapt to the idiosyncrasies of people rather than having people adapt to the idiosyncrasies of the computer.

Ed Yourdon will speak about *Structured Design* — the application of general systems theory to the design of computer programs and systems. Coupling, cohesion and design strategies based on data flow and data structure will also be covered. Yourdon will also talk on the subject of *Evolutionary Design* — the concept of integrating the analysis, design and implementation of a computer system as a series of "top-down" versions.

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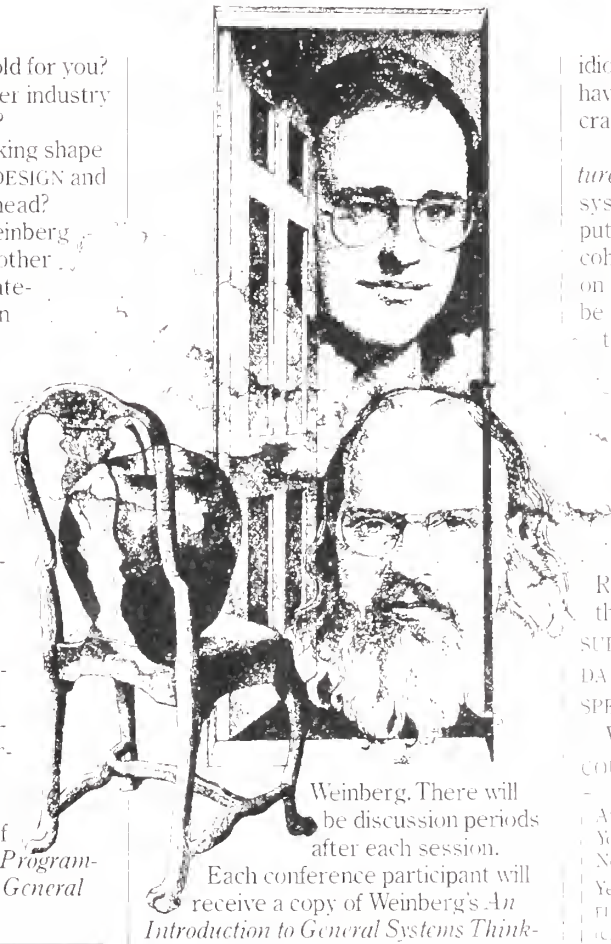


At Bell Canada

On-Line System Keeping Terminals Up

By Ronald A. Frank
Of the CW Staff

TORONTO Bell Canada is keeping customer terminals and other data communications equipment healthy by using an on-line data base of maintenance information.

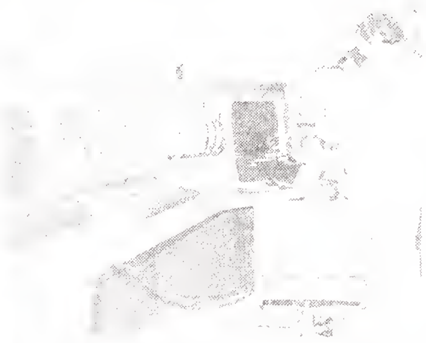
Called the Trouble Report & Information Handling System (Trihs), the data base currently supports 12,000 CRTs, teleprinters, facsimile machines, data couplers and other devices in the Toronto area.

The Trihs information can be accessed from four test centers serving Bell Canada customers with both data and voice offerings by 22 Vucom I CRTs and Datacom 300 teleprinters installed at the test centers.

When a trouble report is received from a customer, the basic data is recorded by an operator who calls up the record of the malfunctioning device on a CRT. If the problem is minor or the problem can be corrected in a routine manner, the operator informs the customer of the action that will be taken.

In cases where on-line tests are required, the operator passes on the trouble report to a test center specialist who also calls up the past maintenance information on his display terminal. On-line diagnostics and other tests can then be run from the test center.

Harsh Chauhan, exchange tester, calls up a trouble record.



Dataroute test center will be added to Toronto data base.

At the test center for exchange services here, about 1,200 call/mo are handled; the average time to fix a problem is 1.4 hour, according to Don Powell, test center foreman.

Among the statistics that can be called up from the Trihs data base are the customer's trouble report; the telephone circuit information showing the lines connecting to the user's location, center office facilities, etc.; a record of the user's problems with other equipment; results of service calls; and the record of routine maintenance, Powell said.

The data base is processed on a Digital Equipment Corp. PDP-11/40 at the Toronto exchange services test center. Future expansion of the system will handle trouble reports from digital data customers of the Dataroute service; Dataroute troubles are now handled with a manual system that includes a card on each long-haul circuit.

This Dataroute information will be added to the Trihs data base together with maintenance information on the packet-switched Datapac network when it begins serving customers later this year. Software for the Trihs system was developed by Computing Devices, which implemented the data base for Bell Canada.

CW Photos by R. Frank

Don Powell, test center foreman, accesses Trihs terminal.

At present, Trihs systems with PDP-11/40s are operating here and in Montreal. Expansion plans call for adding similar systems in major service center cities and later interconnecting the data bases.

Unlike U.S. carriers, Bell Canada supplies customers with a full line of DP and communications equipment, much of which is from independent vendors. All equipment is supported by the test centers and carrier field maintenance force.

Varian Package Lets 1100 Emulate 1004

IRVINE, Calif. - Varian Data Machines has a remote job entry (RJE) terminal software package that allows offloading of Univac 1100 series computers executing under the Exec 8 operating system.

The RJE software system, called the TEN 04/RJE, is said to allow a Varian processor to functionally emulate a Univac 1004 RJE terminal. Using the TEN 04/RJE, the Varian computer can communicate with the Univac CPU while optionally performing concurrent local processing.

Currently, Varian's Hasp/RJE is used to offload IBM 360 or 370 CPUs. It also simultaneously provides a mechanism whereby programs and data can be sent to the IBM mainframe, Varian said.

Both the TEN 04/RJE and Hasp/RJE can operate concurrently under Vortex II, Varian's operating system. Priced at $2,500, first shipments of the TEN 04/RJE are scheduled for September.

Varian Data Machines is at 2722 Michelson Drive, Irvine, Calif. 92713.

Independent Controller Eases Network Expansion

MINNETONKA, Minn. A DP services firm serving the upper Midwest has reported an improvement in its ability to expand its data communications network by installing a Memorex 1270 Terminal Control Unit (TCU) in place of a previous controller supplied by IBM.

Scientific Computers, Inc. (SCI) currently operates 85 communications lines through the 1270 TCU connecting to 85 terminals in client offices in Minnesota, Nebraska, the Dakotas, Iowa, Illinois and Wisconsin.

Primarily wholesale distributors and manufacturers, SCI's clients include a large record distributor, an auto parts supplier, a paper supplier, a paper wholesaler and a hard goods manufacturer.

According to Kirk MacKenzie, SCI's vice-president of operations, the line expansion capabilities of the Memorex 1270 are proving to be superior to the company's previously installed IBM 270X controller in terms of reduced engineering and downtime during network expansion.

"If we now want to add some lines to the system, we merely have to plug in additional circuit cards and cables to the 1270," MacKenzie claimed. "This can be accomplished in a matter of minutes. And it's all plug-compatible with our mainframe 370/135 operating under DOS.

"With the IBM 2701 and 2702 controllers which we used to have, it once took us 18 hours to put in additional lines. It was a major engineering job," he recalled.

The services SCI performs include order entry, invoicing, inventory control, accounts receivables, production and manufacturing control and shop floor control. Data is communicated over private telephone lines at speeds of 134.5-, 2,400- and 4,800 bit/sec.

Output is produced at client locations at speeds ranging from 15 char./sec to 400 line/min.

SCI plans to acquire a second Memorex 1270 soon to accommodate additional lines required by the company's continued growth. Each 1270 has the capacity to handle up to 96 communications lines mixed in any combination of asynchronous and synchronous transmission speeds to 9,600 bit/sec, SCI said.

The 1270 offers speed recognition and transmission code recognition features which automatically allow the use of computer terminals of varying speeds and codes to be used over a single line or lines through the controller; this allows SCI to mix terminals for optimum system configuration, MacKenzie said.

The reliability and maintainability of the Memorex 1270 were factors in the selection of the equipment. "The diagnostic capabilities of the 1270 have made troubleshooting much easier," MacKenzie said.

At the same time, rentals on the 1270 are approximately 30% less than the previous IBM controller, he added.

Digital Labs Device Connects Serial Units

WATERTOWN, Mass. – Digital Laboratories has a connection unit that it said allows a user to combine three RS-232C devices such as Teletypes, modems, printing terminals, video displays and computers in a common system.

Called the 3R, the device can be connected to similar units, expanding "indefinitely" the number of devices that can be combined, the firm said.

Each of the three ports on the 3R have associated switches that interchange the transmit and receive signals and set up operation in either the voltage (RS-232C) or current-loop (20 ma) mode.

The unit costs $350 from the vendor at 600 Pleasant St., Watertown, Mass. 02172.

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(below) *AJ 841*, the rugged Selectronic™ printer terminal. A cost effective replacement for the IBM 2741.

(right) *AJ 230*, a mobile acoustic Teletype terminal. (Also available in auto-answer TWX DDD versions).
(below) *AJ 630*, a 30 cps quiet, non-impact printer terminal with 140 character print line. (APL is an option.)

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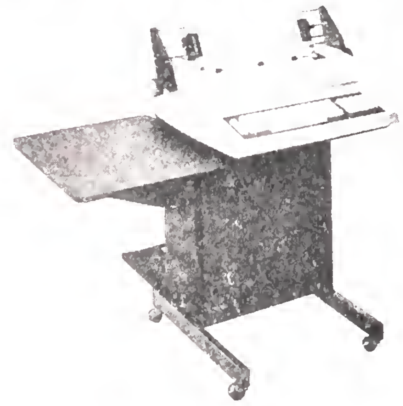

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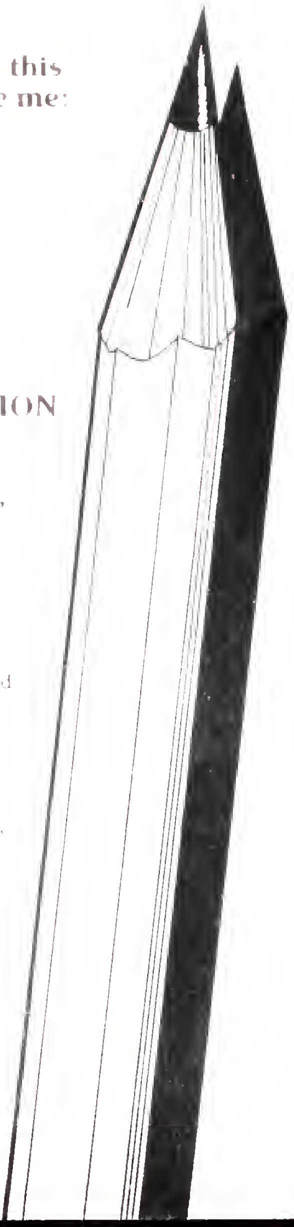

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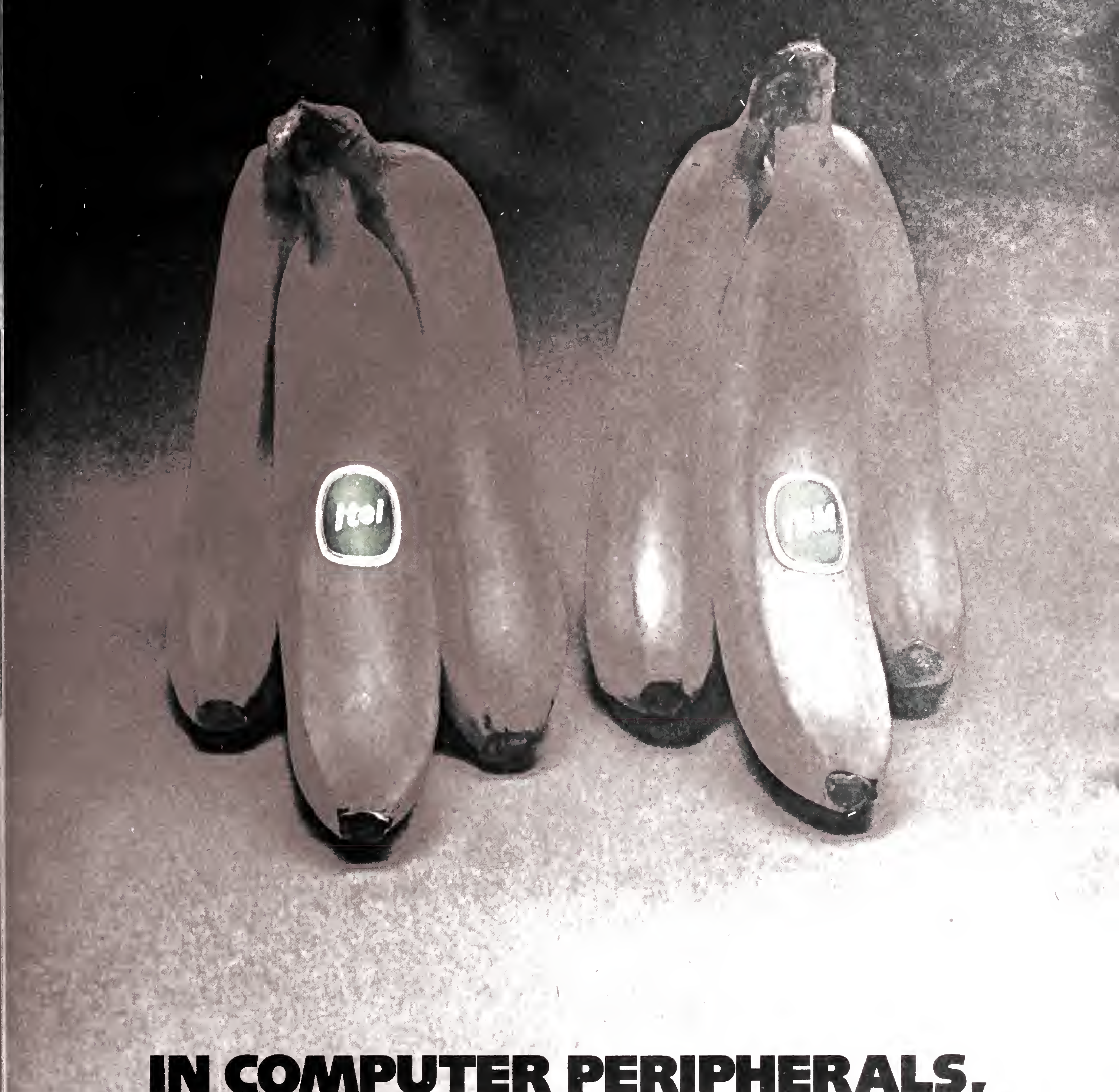

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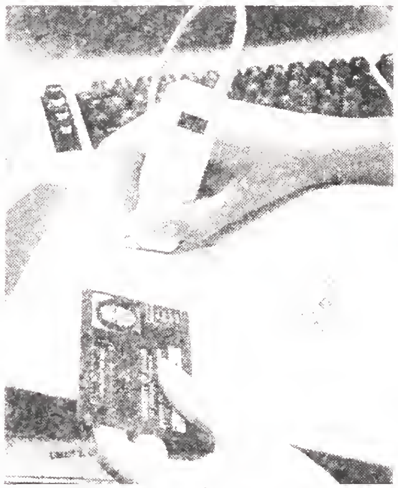

Unit scans book's bar code.

URBANA, Ill. -- The University of Illinois is testing an IBM library checkout system that might allow optical scanning of 300,000 books in the undergraduate library.

The 3270 terminal system is currently operating in a "pilot test" mode, according to a university spokesman, and a decision on whether to adopt the IBM system will not be made for several months.

The 5926 scanner reads student identification numbers and bar-coded labels in books and enters the information into the 3270 CRT. The terminal is connected to a 370/168 operating under CICS, the spokesman said.

There have been some problems with the ability of the scanner to read bar-coded data on the laminated plastic student ID cards. In addition, the labels to be put in each book may have to remain readable by the scanner for 35 years. This compares with a one-time scanning of items in a supermarket, the spokesman said. The student cards are issued for a four-year period and are also subject to wear, which could affect the ability to scan the information.

If the bar code information can be printed permanently enough for the library application, it will take approximately six months to affix bar code labels to each volume in the library.

In the meantime, library transactions are entered into the 3270 CRT via the more conventional keyboard. A file of checked-out volumes is maintained on the CICS system.

If the reliability problems can be overcome, bar code labels in each volume will be scanned at checkout along with the student ID information.

If the IBM system does not work out, the library may look at a similar system installed at another university by Monarch Systems.

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Simulation Methods Help Engineers Find Strains on Tractors

BENTON HARBOR, Mich. – Design engineers at the Construction Machinery Group of Clark Equipment Co. have been using computer simulation techniques for locating strain potentials on new tractor shovel plans for several years.

The computing capabilities needed for this type of design are provided by Structural Dynamics Research Corp. of Cincinnati, Ohio, from their library of structural design software.

The hardware used by Clark includes Tektronix, Inc. display terminals and peripherals. For the last year, Clark engineers have used Tektronic equipment in their "finite element analysis." This analysis often requires as many as 2,000 points to describe a structure.

The equipment includes a 4012 display terminal and a 4631 hard copy unit operating at speeds of from 10- to 120 char./sec to a time-sharing computer. The company plans to add a 4954 graphics tablet to the analysis hardware soon.

Terminal Transactions

With the 4012 it is possible to preview, view and review complicated geometry input. Other uses of the 4012 by the engineering group include plotting statistical failure data and curve fitting programs written in Fortran. The hard-copy unit makes permanent dry copies of the terminal screen either manually from the terminal or under program control. When the 4954 graphics tablet is added, the engineering group will be able to digitize blueprint data off-line into a cassette file for later use.

The first step in any design analysis job is to break the design into a finite element mesh. This is done by hand on the drawing of the model structure. Pertinent data is recorded on an input sheet, and the data file is entered into the computer.

At this point, the three-dimensional line diagram of the planned structure – divided and segmented into a mesh format – is ready for review before the engineer submits the data to the program.

The 4012 displays a graphic representation of the data, and engineers can look at their numeric input via graphics. Mistakes are easy to spot as geometric anomalies. When editing is needed, the terminal is used interactively with the CPU to correct the errors.

Three Basic Parameters

The programs cover three basic parameters which form a total picture of overall structural static and dynamic behavior.

The first parameter is deflection. This measures the kinds of bending and twisting patterns that are inherent in a structure and determines whether it moves to good advantage or not when subjected to anticipated forces and loads. Outline diagrams make deflections graphically clear on the Tektronix terminal screen.

Stress and strain, the second parameter, involves looking for the "hot spots" or areas of high and low stress which can weaken a structure. Both the static and dynamic (via simulated loads) picture of hot spots can be displayed on the terminal screen as isostress contours. This makes analysis as easy as reading topographic maps, the company said.

In the third parameter, engineers look for vibration problems. Every structure has built-in vibration tendencies.

Two years ago, graphics was only available as plotter-drawn diagrams. With the 4012 graphic terminal, Clark engineers get their answers in half the time, and hard copies are available as needed.

Initial Use Limited

Cray-1 Has Power of Five 370/195s

For years as chief technical honcho at Control Data Corp., Seymour Cray developed the world's largest computers for that firm. In 1972 he left to start Cray Research, Inc. in Minneapolis.

The world has now had an opportunity to study Cray Research's first offering – the superlarge, superspeed Cray-1 computer, which is profiled below.

By Richard M. Russell
Special to Computerworld

A quick look at the Cray-1 yields an immediate impression: The system looks as if it would be more at home in an art gallery than in a computer room.

As the photograph shows, the Cray-1 consists of 12 wedge-like units arranged to complete an arc of about 270°. The power supply is hidden within the system's base, which also doubles as leather-padded seating for about 20 people – which may make it the world's most expensive love seat.

A gauge of its power reveals the Cray-1 is roughly equivalent to five giant IBM 370/195s at a price of an 8M-byte 370/168.

Computation Section

- 64-bit word
- 12.5-nsec clock period
- 2's complement arithmetic
- Scalar and vector processing modes
- Twelve fully segmented functional units
- Eight 24-bit address (A) registers
- Sixty-four-bit intermediate address (B) registers
- Eight 64-bit scalar (S) registers
- Sixty-four 64-bit intermedicate scalar (T) registers
- Eight 64-element vector (V) registers, 64 bit/element
- Four instruction buffers of 64 16-bit parcels each

Memory Section

- Up to 1,048,576 words of bipolar memory (64 data bits and 1 parity bit per word)
- Sixteen banks of up to 65,536 words each
- Four-clock-period bank cycle time
- One-word/clock-period transfer rate to B, T, and V registers
- One-word/2-clock-period transfer rate to A and S registers
- Four-word/clock-period transfer rate to instruction buffers

Input/Output Section

- Twelve full-duplex I/O channels
- Channel groups contain either six input or six output channels
- Channel groups served equally by memory (scanned every four clock periods)
- Channel priority resolved within channel groups
- Maximum channel rate of one 64-bit word/800 nsec with 16-bit channel modules
- Sixteen data bits and three control bit/channel
- Lost data detection

Table 1. Cray-1 Characteristics.

Initially, the system's use will be limited to a small circle of scientific users (an estimated 80 installations) with application interests in nuclear research, seismic analysis and weather modeling; Cray Research has no current plans to sell the Cray-1 in the general-purpose computer market.

The Cray-1 offers only Fortran IV compatibility with other computers. Although some Cray-1s could displace existing CDC Cyber 76s, they should not be thought of as replacement computers like the Amdahl 470V/6s; instead, they should be considered "add-ons" to existing computational resources.

Market Small But Growing

Only seven computers are in the range of the Cray-1. These are the Burroughs Illiac IV, CDC Cyber 76 and Star-100, IBM 370/195, Texas Instruments ASC, Goodyear Aerospace Staran and, potentially, the IMS Associates Hypercube systems.

Of these only two computers, the Star-100 and the ASC, can offer comparable processing power.

Illiac IV offers comparable power, but Burroughs no longer markets it. Only one Illiac IV was ever built, compared with four Star-100s and seven ASCs so far.

Observers note, however, that scientists have an insatiable appetite for computational power. The supercomputer market is far from saturated.

Because of its low price ($4.5 million), the Cray-1 is also likely to appeal to entry-level supercomputer users. These users, instead of adding the Cray-1's computational power to existing facilities, may elect to host the Cray-1 with one of the more powerful minicomputers (Digital Equipment Corp.'s Decsystem-20, for example, or the Hewlett-Packard 3000) that are capable of supporting the languages and data base management applications missing on the Cray-1.

Incorporates Minicomputer

The Cray-1 consists of a mainframe and a Data General minicomputer console processor that also doubles as a maintenance control unit. Like other supercomputers, the Cray-1 holds itself aloof from slow-speed peripheral activities.

Each of the Cray-1's 24 I/O channels is a high-speed channel unsuitable for connection to a slow-speed peripheral device. Apart from peripherals relevant to the maintenance control unit, the only peripherals provided by Cray Research are mass storage subsystems equivalent to CDC's 7639/819 high capacity disk drives. Table 1 details the salient characteristics of the Cray-1.

Operating system support for the Cray-1 is limited to a monoprogramming operating system that processes jobs on a first-in, first-out basis. A multiprogramming operating system is expected in the future but, according to Cray Research, it is debatable whether a multiprogramming approach offers significant benefits for a computer like the Cray-1.

Data communications support is provided entirely by minicomputer (or larger) stations. The first release of the Cray-1 operating system will not provide support for any interactive applications.

Except for a library of mathematical routines and some utility programs, applications and data base management software do not exist.

The Cray-1 is roughly five times as powerful as the Cyber 76 (formerly called the CDC 7600), which was also designed by Seymour Cray. Despite differences in word length and instruction set, there are enough similarities between the two computers for the Cray-1 to be considered an evolutionary system from the Cyber 76.

Vector Processing and Pipelining

Vector processing heads a list of 16 improvements over the Cyber 76 that are detailed in an Auerbach report on the Cray-1. There is some scope for vector processing on the Cyber 76 because of that computer's segmented functional units, but it is limited because of the Cyber's fewer registers and small first-level memory.

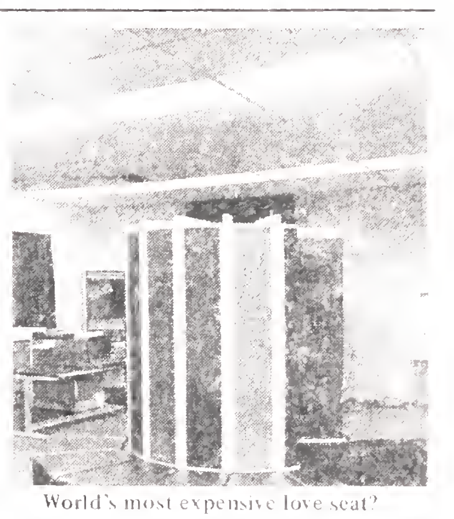
The Cray-1 was specifically designed for vector processing. It has an instruction set capable of both scalar and vector operations.

A scalar operation is one that works on one pair of operands at a time: for example, adding two numbers together and storing the result. This is the mode of operation of most general-purpose computers.

Vector operations involve sets of operands. Using the preceding scalar example, a similar vector operation on the Cray-1 would add two sets of 64 pairs of operands together producing 64 results, all as a consequence of executing only one instruction.

The 64 additions do not take place simultaneously (that technique requires an array processor like the Illiac IV), but are pipelined.

Pipelining means the computer's functional units are segmented so instruction execution can be done in steps. On the Cray-1 each step takes a clock period (12.5 nsec) to complete, so that once a pipeline is full (as many as 14 steps can execute concurrently), results are obtained at the rate of one per clock period until all 64 results have been obtained.



World's most expensive love seat?

Sixty-four is not a magic number; it is the number of vector elements in one of the Cray-1's eight vector registers.

The Cray-1's architecture allows for the simultaneous operation of its functional units in both scalar and vector modes. To take advantage of this in vector mode, a technique called "chaining" is utilized.

For example, each of the 64 results from a vector add can be made available immediately to a vector multiply operation taking place in another functional unit. Results from all functional units become available every clock period.

Bandwidth Limits

Chaining, with its potential for creating interim results in local storage for immediate use, effectively increases the Cray-1's maximum number of results per second. However, the Cray-1's bandwidth of 80 word/sec limits the number of results that can be stored in memory. Chaining takes place automatically, although the programmer can influence the degree to which it occurs. In theory, all of the functional units could be chained together to perform a multistop operation.

In practice, usually not more than four units are chained. In a table lookup operation, for instance, the memory/read, shift, integer/subtract (to achieve a compare) and vector-mask generation steps could all be chained together to achieve a very fast scan of table entries. The vector-mask operation is used to determine which of the 64 result elements after the vector subtract is zero, i.e., how far through the table the equal condition occurred.

In some ways, chaining can be thought of as parallel processing, but it should be remembered that each "parallel" operation is actually offset from its neighbors by a variable number of clock periods. In true parallel processing, as found on the Illiac IV or Goodyear Aerospace Staran, parallel operations occur simultaneously.

Russell is project editor for Auerbach Publishers, Inc.

Copies of the compelte Cray-1 report are available for $25 from Auerbach at 6560 N. Pack Drive, Pennsauken, N.J. 08109.

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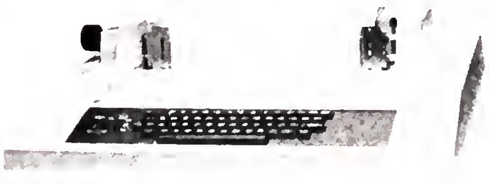

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University Finds Moving Systems 'A Piece of Cake'

By Carl C. Harrington Jr.

Special to Computerworld

SEATTLE – A university DP center here moved two computer systems to a new building one mile away in only 51 hours of downtime.

The University of Washington Academic Computer Center planned the operation as two primary moves in one weekend. The Control Data Corp. Cyber 73 mainframe, moved on Saturday, required eight hours to pack, eight hours to ship and eight hours to bring back up.

The CDC 6400 system continued to process work for 12 more hours and was powered down at midnight Saturday. From that time until 3 p.m. Monday, computing services were unavailable to users. By Tuesday at 8 a.m., the center was operating again at full service.

The CDC 6400 move was more difficult than the Cyber move because its cables are not quick disconnects and each pin must be removed. After consultation with Jim Weir, CDC customer engineer (CE) in charge at the site, it was decided to move the university-owned mainframe as one piece.

Four moving companies bid on the project and the Seattle branch of Lyon Moving & Storage got the contract.

It required six hours to move the mainframe into the truck and four hours to get it back out. It would have required 72 hours to disconnect and reconnect the 6400 at the new site; therefore, 62 hours were saved by moving the 6400 in one piece.

All equipment was moved on schedule with no damage. The communications equipment was switched over on Sunday. The byword of the entire move was: "It's a piece of cake."

All was not a bed of roses, however. Twelve hours before the move (Friday afternoon) the packing material had not arrived and could not be found. It was located at the airport at 6 p.m. A trucking strike had held it there.

Two operators were dispatched with a light truck from the university motor pool and they picked up the packing material. The material weighed 900 pounds and had to be taken out of the truck piece by piece because there was no equipment with which to unload it.

Problem With 6400

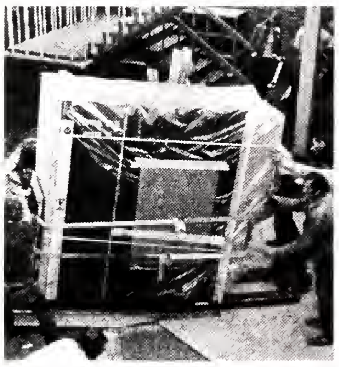
After the initial power-down to disconnect the Cyber 73, the CDC 6400 would not come back up. The problem could not be corrected until noon, increasing the total downtime to 51 hours.

When everything was established in the new building, additional minor problems arose. The fire alarm system went off randomly. The air conditioning needed adjusting and the system shut the computers down when the outside temperature went above 75 degrees. That problem was quickly corrected.

However, the curiosity of a new maintenance man flipping switches left the CEs literally holding the system up while the staff ran around trying to find the culprit.

'Better Than Expected'

Overall, the operation went far better than the center had dared to hope. Six months of planning paid off with dividends. The elaborate contingency plans were never needed, but they were held ready in the backround.



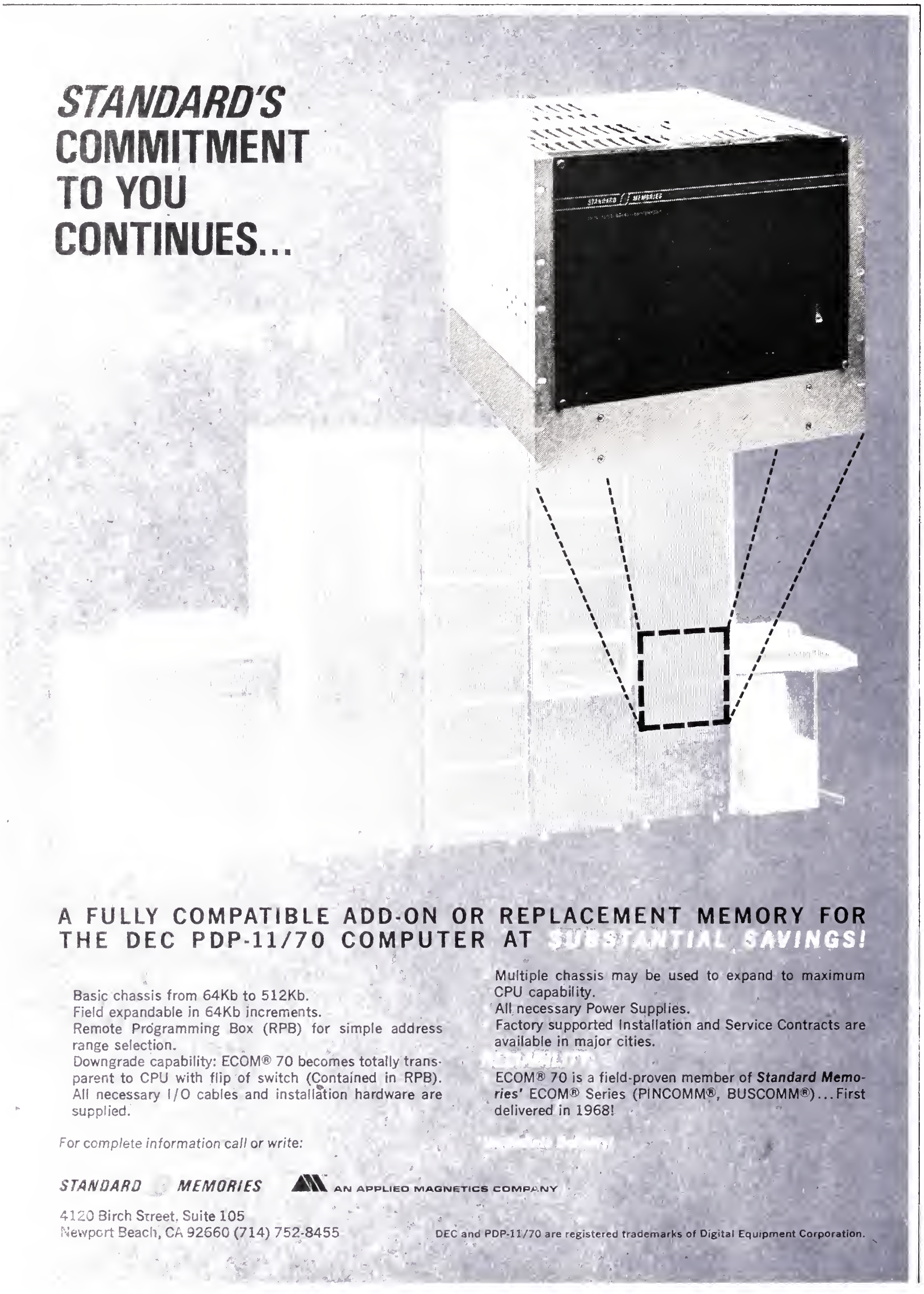
This illustrates a moment in the mile-long move of the university's two computer systems.

The planning did force the center to consider potential problems in detail, thereby discovering otherwise unforeseen problems and correcting them before the move. It found in general, through this process of asking what can go wrong, that apparently minor problems can greatly weaken or disrupt the entire process.

Problems Identified

For example, the basic approach to the move was to take advantage of having two systems and move one at a time. The tape controller was not initially viewed as crucial, but it was identified as the only unit the center does not have at least two of, and it could not start either system without a tape drive. With ample lead time it was able to obtain a second one for the duration of the move.

It also found it was contractually bound to use the vendor's packing material. The center could not proceed with the move without it. The material was ordered early, but, because of a strike, the center did not obtain it until the last minute.



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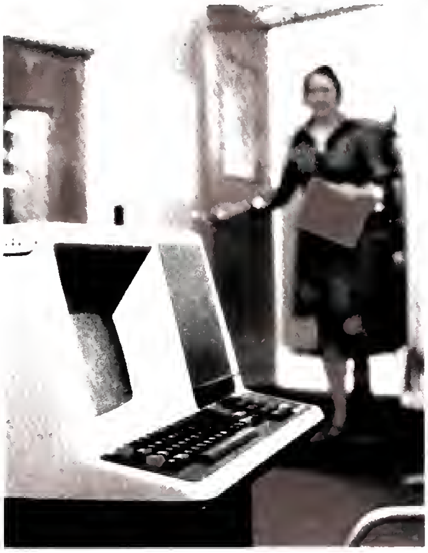

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Mini Bits

HP ROM Control Store Card Available for 21MX CPU

PALO ALTO, Calif. – A read-only memory (ROM) control store card for the Hewlett-Packard Co. (HP) 21MX minicomputer is available from that firm.

The card can store eight 256-word modules or 2K words of microcode. It uses chips that can be programmed with a programmable read-only memory (Prom) writer and mounts directly into the I/O section of the 21MX processor, HP said.

A collection of six Prom chips can be used for verifying the card's operation in case of failure, the firm noted.

The card costs $450; the six Prom chips cost $80. HP is at 1501 Page Mill Road, Palo Alto, Calif. 94304.

HI Develops Line Printer For Micro Development Systems

AUSTIN, Texas – A line printer designed for use with microprocessor development systems has been introduced by Houston Instrument (HI).

The standard printer has 80 print columns and operates at speeds up to 2,400 line/min; a 132-column version printing at speeds up to 1,400 line/min is also available, HI said.

The interface signals for the printer have been arranged to allow ease of interfacing with most known microprocessor systems, the company added.

The unit costs $3,000 from the firm at One Houston Sq., Austin, Texas 78753.

Fire Safe Stores Magnetic Media

PALO ALTO, Calif. – Tab Products Co. has a magnetic media fire safe for small system users.

Called the Datagard, the media safe has been certified by the Underwriters Laboratory to maintain a maximum internal temperature of 150° for one hour with a maximum humidity of 85%, the firm said.

The safe, which costs $1,095, stores two IBM 3348-type data modules, 10 IBM 2315-type disk packs or other combinations of magnetic media including floppy disks, tapes, microfilm and cassettes, the company said from 2690 Hanover St., Palo Alto, Calif. 94304.

Fast Fourier Unit Fits PDP-11s

WOODLAND HILLS, Calif. – The MFFT-11 Fast Fourier Transform Processor is now available for use with the Digital Equipment Corp. PDP-11 mini, according to its vendor, the Elsytec Division of Compata, Inc.

The unit, a matched combination of a hardware array processor and signal analysis software, can be used in applications including medicine, biophysics, underwater acoustics, visual image enhancement and speech and voice recognition, the firm said.

The MFFT-11 costs $6,900 and is available from 6150 Canoga Ave., Woodland Hills, Calif. 91364.

Qantex Links System to Micros

PLAINVIEW, N.Y. – Qantex has introduced interfaces to link its data storage systems to the Digital Equipment Corp. LSI-11 and the Mits Altair 8800 microcomputers.

The interfaces allow extended memory capacity of 22.3M to 180M bits, depending on the Qantex unit selected.

The Qantex Model 2200 single-drive system interfaced to the LSI-11 costs $2,815. The interface for the 8800 costs $415 from Qantex at 200 Terminal Drive, Plainview, N.Y. 11803.

Because of Taxpayer Demands

Police System Designed to Patrol Data

By Esther Surden
Of the CW Staff

LAKE FOREST, Mich. – Because residents of this affluent Chicago suburb demand accountability for their tax dollars, the police department here has instituted a minicomputer-based information system.

"Our average mortgage last year was $115,000," according to Richard P. Johnson, director of fiscal and administrative services for the city. "Since most of our citizens are executives of large companies, they expect high productivity, cost-effectiveness and optimized allocation of resources."

In order to create a police management and performance information system, the city applied for a Law Enforcement Assistance Administration grant through the state Law Enforcement Commission. The goal was to develop "a police reporting system, hopefully one that could be computerized and placed on our IBM 3," Johnson said.

But "we really developed a three-phase police reporting system," he added.

The first phase of the project was a computerized state reporting system. "We had a state report that we were previously compiling by hand," Johnson said, explaining the statistics were manually tallied and then a report was typed and sent to the state.

"We redesigned the field reports the officers fill out," and information from these reports is now keypunched into the system. Programs were developed to edit the information and the state reports are printed from the system.

In the second phase "we took the same case files we built up from the state reports and used them to develop a series of local reports." Such reports, Johnson said, include crimes categorized by location, time of day and day of week and analysis of the crime clearance rates and the different types of crimes occurring.

The third phase of the project involved a manpower assessment system that analyzes what each officer is doing in terms of the amount of time being spent on various activities.

The system, called the Career Organization Assessment and Development System tells the department how close it is coming to meeting the goals it has set; the force can therefore see the impact on the clearance rates of the various amounts of time being put into investigations or on patrol, for example, Johnson said.

Time Savings Realized

The resulting police reporting system has been credited with saving an average of 60 man-hours monthly in office paperwork, improving the police assignment process and providing a basis for officer performance assessment.

"Police work is labor-intensive, whether in a large city force of thousands or in our small department of 27 patrol officers and 21 support officers and staff," John E. Daily, project analyst, said.

"We have always known in gross terms what the officers were handling. The information was being collected. But precisely why and how and where they were deployed and how that matched with patterns of activity and community needs were questions we couldn't answer," he noted.

Prior to the implementation of the system "we knew what kind of information we wanted," Johnson said, "but we weren't sure if it would be adaptable to our size IBM 3."

The city has been leasing an IBM 3/10 since 1972. It is a card-only unit, Johnson noted, and has only 8K of memory.

It took a project analyst, a secretary and Johnson with the help of a part-time programmer and systems analyst about a year to bring all phases of the accountability report up. "We ourselves spent about $10,000 to $15,000," he said, adding the grant amounted to about $50,000.

Laboratory's System Assures Chemical Analysis Performed

PITTSBURGH, Pa. – A minicomputer-based recordkeeping system at USS Chemicals here is helping laboratory technicians assure the analysis needed for each chemical shipment is performed.

The Laboratory Services System (Lass) combines a Varian Data Machines minicomputer and applications programs written by the USS chemists, according to Dr. Robert Buckingham, chief plant chemist.

The configuration includes a V72 with 32K of core, disk, a CRT, dual tape cassette and a Centronics Data Computer Corp. line printer.

The system is used to enter orders, compile order lists, release shipments and generate daily shipment reports. The data base contains about 600 customer addresses along with information on special testing requirements, customer product codes and information on whether a "Certificate of Analysis" must be shipped with the product.

Previously this information was entered in loose-leaf binders and retrieved manually.

The company decided to purchase a Varian system because of its experience with another of the vendor's systems which had given the lab good service. A determination that a real-time system was needed was made because "when a truck is sitting waiting with an analysis to be done, it has to be done now, not on a batch basis," Buckingham explained.

The company also liked the $40,000 price tag on the system. "We investigated a few other vendors, particularly Digital Equipment Corp., but we went with Varian," he said.

Order Entry Function

Order entry is one of the main system functions. An order from a salesman can be entered into the computer by typing in a 10-digit customer code, the USS Chemicals order number, the requested shipping date and the customer order number.

With those four entries, the computer searches the address files and in one second or less displays the address associated with the customer code.

After the operator verifies the customer address is the correct one, the system displays any requirements for a Certificate of Analysis and requests the products and weights in each order. Following that entry, the mini displays the USS Chemicals identification and the customer code, if any, for verification with the actual order.

Once the orders are stored in the mini, they can be cancelled or altered by an operator. A variety of lists, which previously had to be compiled and typed by a clerical worker, can be displayed on a CRT or printed out.

Lists may be displayed for all of the orders in the file chronologically by shipping date and show the order number, shipping dates, products and the first line of the customer address.

A list giving all the orders scheduled to ship between any two dates can be displayed showing the order date, quantity, customer address and the total quantity for each product between the dates given. Lists may also be displayed showing all the orders in the file for a given customer or a particular product.

Shipment Controls

A sample from every product shipment about to leave the plant must be analyzed by USS Chemicals technicians to determine that the product meets sales specification requirements and that it can be released for shipment.

All shipments of plasticizer, a plastic softening agent, for example, are tested for appearance, odor, specific gravity, water content, acidity and color.

Additional analyses are often required to determine whether the product meets special customer specifications. A wire manufacturer may want an analysis of a plasticizer shipment to determine the product's direct current resistivity; another manufacturer may want the product tested for viscosity.

Approximately 200 special customer specifications are maintained in the Lass data base, Buckingham noted.

When a sample bottle arrives in the lab, the technician enters the order number at the CRT and the customer's address and specifications are displayed.

(Continued on Page 28)

NCR Adds Turnkey for Thrifts

DAYTON, Ohio – An entry-level on-line turnkey system based on a minicomputer is available for thrift institutions from NCR Corp.

The Mini On-Line System Technique (Most) system uses an NCR Century 8200 as the host processor and an NCR 755 communications preprocessor for on-line communications with financial terminals, the firm said.

The system can support up to 10 NCR 270 financial terminals as well as NCR 770 self-service terminals or NCR 796 visual display terminals, according to a spokesman.

System mix and throughput requirements will determine the maximum number of terminals that can be supported, he added.

The system uses Century 101 simulation and software is compatible with larger NCR systems, the firm said.

Six modules of software are available: savings, loans, alpha locator, general ledger, statement savings and loans in process.

Hardware includes an 80K Century 8200 processor with two 9.8M-byte disk units, a card reader and a line printer as well as the 755 preprocessor with communications gear.

The hardware costs $103,435 or $2,732/mo on a five-year lease. Software is subject to a $2,800 one-time license fee for the first 12 months and a monthly $112 fee thereafter.

The software is also subject to an installation fee, NCR said from Dayton, Ohio 45479.

To Control Researcher Access

Mini-Based System to Manage 3 Million Documents

KEW, England - A minicomputer-based system that will be used to locate records from more than 3 million documents on 76 miles of shelves will be operational in the Public Records Office (PRO) here soon.

Developed by Data Logic Ltd. in conjunction with PRO, the system will include security control, indexing and document request, checkout and return features.

The system will be based on Data General Corp. hardware including a Nova minicomputer operating under RDOS, two 10M-byte disks, seven CRTs and four teleprinters.

Other hardware will include a Data Recognition Corp. optical mark reader, three badge readers and an interface to three turnstiles, the user said.

PRO maintains the archives of the Central Government of the UK and is a repository of official documents ranging back to rolls of sheepskins.

When the system is put to work, each researcher will have a ticket that allows access to the building via a turnstile and an on-line badge reader if the user is authorized.

On passing through the turnstile, the researcher will enter the document consultation area which includes two search rooms with seating accommodations for 512 people, a map consultation room and a reference room containing the indexes of the archives.

When the researcher finds the appropriate document in the index, reference and personal identification numbers will be keyed into the CRT.

New users are presented with a menu for guidance and there is an assistant to help out.

The system validates the security code and gives the document's location.

On the appropriate floor, a teleprinter prints out two copies of the requisition which names the reader, his identification and seat number, etc. An assistant retrieves the wanted material and replaces it with one copy of the requisition. The document is then given to the reader with the second requisition copy.

When the reader returns the book, the second copy of the requisition is put through an optical mark recognition reader which records the return of the document. Then, after the document is returned to the shelves, the assistant runs the first requisition copy through the mark reader to record the return of the document to the shelves.

System Assures Analyses Done

(Continued from Page 27)

After running the required tests, the technician enters the test results, the tanker truck number and the tank from which the chemical is being shipped.

After completing the transaction, . a printer at the shipping office produces the shipment releases and prints a Certificate of Analysis if required.

If a product is off specification, the mini requires the name of an individual authorized by the customer to release the shipment before it will allow the release form to be printed.

Prior to this, it was possible for a technician to miss the customer specifications and release the shipment on the basis of the sales specifications only, Buckingham said.

All the transactions are logged on a disk where they can be readily accessed, modified and updated and are later transferred to cassettes for permanent file storage, he added.

The V72 has also streamlined the production of daily half-sheet shipping reports. These are reports giving such information as product, customer and test results on each of the previous day's shipments which go to the sales, material handling and production departments.

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CI Notes

Univac Closing Utica Plant, Transferring Operations

UTICA, N.Y. – Univac plans to terminate operations at its manufacturing facility here. About 800 to 850 persons will be laid off.

Utica operations include the manufacture of the 90/30 computer system, keypunches, printers and card punches and readers. These products will be transferred to other plants, although final determinations have not yet been made.

The principal reason for the move, Univac said, is that technological advances have reduced the space requirements for the manufacturing and testing of computer equipment.

Univac plans to phase out the facility by the end of March 1977. The 700,000 sq-ft plant will be put up for sale.

Of the 950 persons currently employed, it is expected that 100 to 150 will be transferred to other company locations, the firm said.

Scotch Strike Halts Level 66s

NEWHOUSE, Scotland – Production of Honeywell Information Systems, Inc.'s Level 66 computers here has been halted by a strike of hourly workers.

The dispute, begun Aug. 11, involves less than 50% of the 270 employees attached to the computer operations here, an HIS spokesman said.

The strike arose from different interpretations by the firm and the union as to when the company could implement raises in accordance with Department of Employment wage controls.

Talks were scheduled for early last week.

Supershorts

The Canadian Cabinet has approved an application from University Computing Co. to establish a Canadian subsidiary called UCC (Canada) Ltd.

– – –

Microdata Corp. has delivered its 500th Reality system.

Fears Harm to Remote Processing

Adapso Making Stand Against Bell Bill

By Toni Wiseman
Of the CW Staff

MONTVALE, N.J. – The Association of Data Processing Service Organizations, Inc. (Adapso) has mounted a congressional and corporate program to protest the Consumer Communications Reform Act of 1976 which, in its opinion, "poses serious adverse consequences for users of remote-access data processing and time-sharing services."

The program is directed toward two primary groups: members of Congress and users of remote-processing services, according to Jerome L. Dreyer, Adapso executive vice-president.

Senators and representatives who to date have supported the Reform Act, also known as the Bell Bill, have received one set of correspondence from Adapso members, while those who have not supported the legislation have received a different set, Dreyer said.

In addition, Adapso members are asking their customers to protest possible passage of the legislation.

In a position paper, Adapso's Remote Processing Services Section stated "it is relatively easy to see that this legislation, if enacted, would lead to increased computer system costs.

"For one thing, the necessity to reconfigure existing networks would . . . inevitably lead to the need to maintain duplicative facilities necessary only for purposes of complying with the conflicting dictates of various jurisdictions.

"These increased costs would necessarily have to be passed along to the consumer in the form of increased prices for the goods or services provided by the industries which have incurred higher computer systems costs," Adapso stated.

Enaction of the legislation would also result in the elimination of competition between telephone common carriers, in particular specialized common carriers, it said.

Passage of the Bell Bill would provide, by statute, that the Federal Communications Commission (FCC) must accept

(Continued on Page 31)

Changes to Accompany Growth In Software Industry: Bauer

WASHINGTON, D.C. – "Ten percent to 15% of computer program steps being executed today represent those from purchased software. In the next 10 years, that figure will rise to the 75% to 80% level," Dr. Walter Bauer recently predicted.

"Revenues from software products will grow to $1 billion in 1980 from a 1976 sales level of under $500 million, according to Bauer, president of Informatics, Inc.

"Software products will be priced on number of commands executed or amount of mainframe time used, rather than on a straight purchase or lease consideration," he told a meeting of the American Institute of Industrial Engineers here.

Bauer also predicted a "large-scale shakeout" in companies supplying software products because of a lack of understanding of software product marketing problems.

In the last three years alone, he added, both the number of software products suppliers and the number of products offered by these companies have nearly doubled.

'Immature' Market

Business and industry today are challenging and testing the cost-effectiveness of their DP operations, Bauer commented, thus providing impetus for the continued development of software that is expertly conceived, "productized" and made easily available to a multiplicity of users.

Based on sound, fundamental eco-

(Continued on Page 31)

FASB Revises Lease Accounting

By Molly Upton
Of the CW Staff

STAMFORD, Conn. – In a second exposure draft, the Financial Accounting Standards Board (FASB) has set forth its criteria for the classification of leases by both lessees and lessors as well as other information on how to account for the transactions.

If approved, the proposal requires firms to apply the standards to leases begun on or after next Jan. 1 and requires retroactive restatement by the end of a four-year transition period.

The new draft takes into consideration the time value of money.

Although the basic lease classifications of the first exposure draft have been retained, changes were made in the criteria for classifying leases after the board received about 240 responses to its first draft.

The formerly proposed criteria of 25% residual value and of special-purpose property have been eliminated.

A new criterion, based on recovery through minimum lease payments of 90% or more of the fair value of the leased property, has been added.

Minimum lease payments, as defined for this purpose, include residual-value guarantees and certain other lessee obligations in addition to rent, FASB observed.

The proposal calls for lessees to classify a lease as a capital lease if it meets one or more of the following four criteria:

- The lease transfers ownership of the property to the lessee by the end of the lease term.
- The lease contains a bargain purchase option.

(Continued on Page 33)

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CIRCULATION DEPARTMENT

Sales to Insurers To Almost Double

NEW YORK – Annual sales of DP equipment to the insurance industry will rise from the current level of $526 million to $1.5 billion by 1985, according to a recent study by Frost & Sullivan, Inc. (F&S), a market research firm.

During the next 10 years, about $8 billion worth of computer systems, including peripherals, will be sold within the insurance industry, F&S said.

Of this figure, $6.68 billion will be for systems, $1.4 billion for data entry equipment, $481 million for software and $2.45 billion for services.

The most significant unit sales will be in small business computers, which will range in price from $10,000 to $100,000, F&S noted.

The bulk of these sales will be made to independent insurance agents, the study said.

In addition, the study predicted a trend toward on-line systems, estimating that about 1,000 national insurance companies will implement large on-line systems over the next 10 years to allow direct communication between field offices and regional or central headquarters.

"While DP has certainly been a major part of the insurance industry, it is now being extended in many insurance companies and is starting to be accepted at the independent insurance agent level. The independent insurance agent market represents a virgin territory," the study stated.

Integration will be the key word in the new systems as DP becomes part of all functions and replaces the flow of paper, the report stated.

Changes Seen Along With Software Mart Growth

(Continued from Page 30)

nomics, the future of the software product seems assured, he said.

"However," Bauer told attendees, "in my view the market for software products is immature in many respects. Neither the buyer nor the seller fully appreciates the cost of developing and marketing software.

"If a supplier is to make a profit, he must thoroughly understand his costs and demand an appropriate price," he said.

Bauer said the seller must produce code which can withstand the utmost scrutiny: it must be well-organized and lucid and documentation must be impeccable.

To amplify the problem, the buyer is demanding increasingly higher quality code, better documentation, trial periods, benchmark tests and high-quality field support. The seller is required to meet these demands to compete in the marketplace while absorbing the high costs of marketing an extremely complex product, he said.

If a product cannot be sold for at least $10,000 a copy, it probably has to be sold on the basis of a direct mail effort, he pointed out.

Because of this lack of understanding of software product marketing problems there is sure to be a large-scale shakeout in companies now supplying software products, Bauer predicted.

Increasingly larger investments are needed and an experienced and highly qualified approach to the business is mandatory; products will become [illegible] more off-the-shelf in nature and higher priced, he said.

It appears inevitable that only a relative few of the larger or better suppliers will survive in the software products game, Bauer said.

A viable, productive industry will result, he added, offering a good supply of products from which the user may choose.

"Pricing policies," Bauer said, "will be transaction-based in the next decade. More and more software products will be priced on the basis of number of commands executed or amount of mainframe time used, rather than on a straight purchase or lease consideration," he said.

Adapso Takes Stand Against Bill

(Continued from Page 30)

AT&T's favorite incremental cost methodology as being appropriate in the rate-making context before issuance of final reports by state and federal agencies concerning that methodology, Adapso said.

It would also result in antitrust immunity for acquisitions by telephone companies, the position paper noted.

Adapso is concerned that regulation of interstate computer systems which are now either unregulated or regulated by the FCC would fall under the jurisdiction of individual state public utility commissions.

"Such a step would fragment the existing uniform regulatory scheme which has proven to be advantageous, as is evidenced by the significant technological advances which have been made in computer networks through the efforts of independent companies," the organization said.

"Relegation of jurisdiction over station equipment and termination facilities to state commissions is in direct conflict with having a unified nationwide telephone system.

"It would also render impracticable, if not impossible, many current remote-access data processing and time-sharing applications," Adapso stated.

Expansions

Manufacturing Data Systems, Inc. has relocated its corporate offices to 4251 Plymouth Road, Ann Arbor, Mich. 48105.

Wang Laboratories, Inc. will be relocating its headquarters to the 275,000 sq-ft plant previously occupied by Mostek, Inc. in Lowell, Mass. as of Oct. 1.

Data Devices International, Inc. has added a new building to its facilities in Woodland Hills, Calif.

Beehive Medical Electronics, Inc. has begun building a headquarters facility adjacent to the Salt Lake City International Airport.

Logical Machine Corp. is moving its manufacturing facilities and marketing headquarters to Sunnyvale, Calif.

Dimensional Systems, Inc. has moved its sales and R&D operations to Woburn, Mass.

Incoterm Corp. has more than doubled its administrative and engineering space in its move to 65 Walnut St., Wellesley Hills, Mass. 02181.

Tesdata Systems Corp. has moved its manufacturing and production engineering operation to Sunnyvale Oakmead Village Industrial Park in Sunnyvale, Calif.

Dr. Dixon Doll will show you how to plan and manage effective data communications systems.

Data communications has become a focal point for new growth, and new economies, in computer use. But there are many hazards for the user. Even many up-and-running systems have costly flaws that can be improved through better management methods. And that's where these seminars come in.

Computerworld has sponsored Dr. Dixon Doll's two seminars on data communications because step-by-step, they give you the practical information you need to evaluate data communications networks and use them effectively.

1. **Data Communications Course #1010 — Practical Data Communications Systems and Concepts.** Led by Dr. Dixon Doll, this two-day seminar is designed for people who are relatively new to data communications. It presents you with a comprehensive exposure to the important terminology, economic aspects, and functional characteristics of contemporary data communications devices, techniques and systems. Money-saving ideas are an important part of this seminar, and you will see how to implement them using innovative techniques like split-stream modems, diagnostics for fault isolation, modem-sharing devices and digital bridges, remote multiplexers/concentrators, and front-end preprocessors. The seminar will focus on the latest developments in data communications, such as SDLC, IBM's new Synchronous Data Link Control, DDS, Bell's new digital data network, and HiD-LoD, Bell's newly effective tarriff for voice lines. And we'll look at the impact of satellite carriers and specialized carriers as well. This seminar will give you the ability to recognize and solve specific problems in data communications so that you can effect cost savings and performance improvements at your installation.

2. **Data Communications Course #1020 — Advanced Teleprocessing Systems Analysis and Design.** Course 1020 will give you an in-depth familiarity with techniques for planning, designing and managing cost-effective commercial data communications networks. Class study and discussion of specific telecommunications problems affecting your organization is an important part of this three-day seminar, and you'll have the opportunity to present such problems for analysis by the instructor and class members. You will also participate in project teams assigned to individual data network case studies, and you'll see what approaches have been taken by other organizations with networking problems similar to your own.
Like Course 1010, this seminar will focus on recent developments in data communications. But Course 1020 will concentrate on greater depth and detail. It assumes that attendees are already involved with and experienced in data communications networks, and that they desire very detailed knowledge in the field. Emphasis will be placed on thoroughly examining contemporary cost-reduction networking ideas, along with specific procedures for implementing them. Design problems associated with terminal selection and line organization will be addressed in detail as they apply to recent developments like SDLC, satellite transmission and integrated multiapplication nets. Algorithims for determining line speeds, number of ports the optimum mix of WATS and DDD for switched nets will also be examined. This seminar will give you the ability to perform your own design calculations, and it will enable you to recognize areas in present (or proposed) systems where cost savings are possible. And you will gain practical mastery of the techniques you need to realize these savings.

Dr. Dixon R. Doll is the Seminar Leader

Dixon R. Doll received his B.S. degree in Electrical Engineering (Cum Laude) from Kansas State University, and as a National Science Foundation Scholar he received his M.S.E. in Electrical Engineering and PhD in Systems Engineering from the University of Michigan. Dr. Doll has extensive experience with equipment vendors and users. He is the principal architect of the Communications Network Configurator, a family of computer programs used by the Raytheon Data Systems Company to design and analyze end-user computer-communications networks. As Head of DMW Telecommunications Corporation, which he founded, he designed Household Finance Corporation's North American Orbit network, involving more than 2700 terminals and 10 concentrators throughout the U.S. and Canada. He has developed teleprocessing network analysis software for many other major organizations, including Burroughs Corporation, IT&T, MCI, Procter & Gamble, Sun Oil, Texas Instruments and VWR Scientific Corporation. He is also a visiting staff member at the IBM Research Systems Institute in New York, where he teaches courses on data communications fundamentals, teleprocessing network design and resource sharing computer networks. Dr. Doll, a founder and Technical Director of the International Communications Corporation's ICC Institute in Miami, will lead the entire seminar.

Charges and Enrollment

The charge for Course 1010, a two-day seminar, is $350 per registrant, and $300 for additional registrants from the same company. The charge for Course 1020, a three-day seminar, is $450 per registrant, and $400 for each additional registrant from the same company. Both seminars include continental breakfasts, luncheons and all course materials at no extra charge. Hotel rooms, if necessary, are not included, but we have reserved space at the seminar hotels for attendees who wish them.

To enroll, look over the schedules below, fill in the coupon and send it in. Remember enrollment is limited and no space can be firmly held until we have received check or purchase order.

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Vice President, Editorial Services
Computerworld
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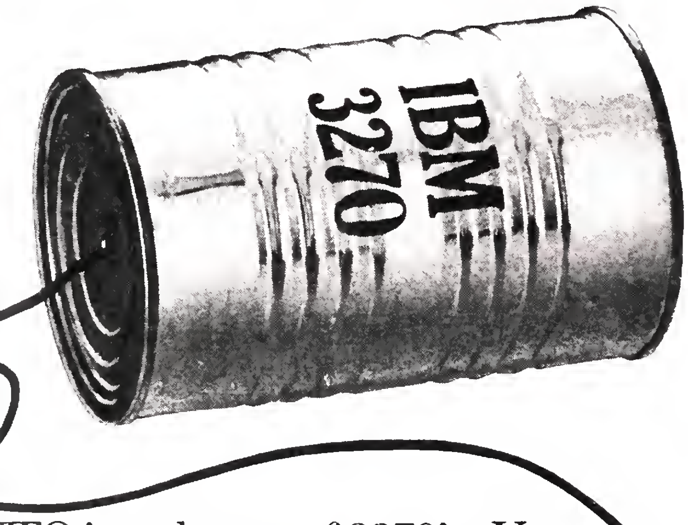

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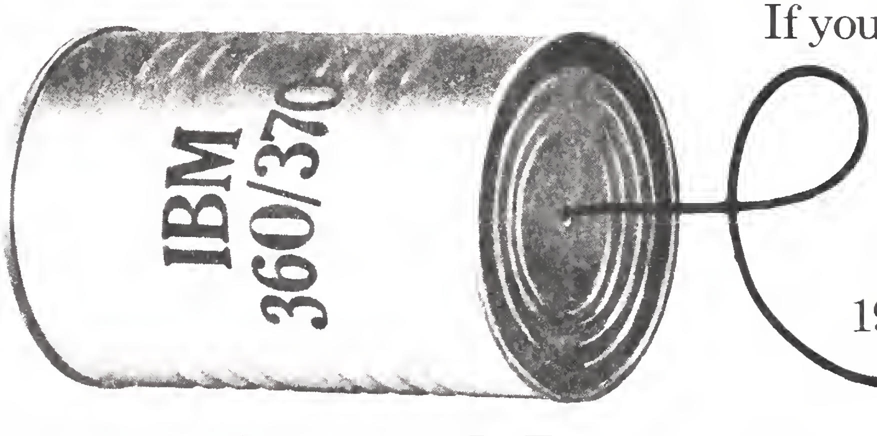

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Lessors Examining Impact of FASB Draft

By Molly Upton
Of the CW Staff

WHITE PLAINS, N.Y. – One thing about the Financial Accounting Standards Board's (FASB) revised exposure draft on lease accounting is certain – lessors are now scurrying to their computer rooms to analyze the effects of the new criteria for classifying leases.

Although the new draft is an improvement in several ways on both current methods and the previous draft, principally because it provides clarification, there are a couple of provisions that Barry Korn of Barrett Capital and Leasing Co. here said are not as favorable to lessors as they might be.

For instance, the section on gross profits on sales-type leases favors computer manufacturers rather than third-party lessors, he said.

Although the requirement they use, the present value of the residual, is less favorable to manufacturers than the previous draft that allowed full residual value, this whole area is "relatively unfavorable to third-party lessors and I think gives an unfair advantage to manufacturer dealers," he said.

This reduces the cost of carrying the lease, he said, allowing manufacturers to receive a greater accounting impact.

Another item of which Korn disapproves is that the draft singles out firms principally engaged in leasing to display leasing information in footnotes.

Calling this "unfair," he said it "potentially favors the large companies in which leasing is a part, such as large banks.

"If leasing is material to a company's business, therefore if one has to disclose this information to be meaningful, I think the burden should be equally on all of the major lessors regardless of the particular capital structure of the company," he said.

Large banks can interpret this provision to mean that leasing, although significant to them, is not their principal business, so they are not required to give footnotes.

Korn saw other items in a positive light. The amortization period for capital leases, for example, is favorable to lessors since capital leases meeting certain criteria may be amortized over the life of the asset rather than over the period of the lease term, he noted.

The FASB draft introduced new criteria for accounting for subleases which is beneficial, he said, since there were previously few if any criteria to cover this aspect.

He said the requirement of retroactive restatements of results is not as unfavorable as most people may think.

"The clarification of the issue itself is positive," he observed. The 90% recovery of fair value of property is better than the 25% residual value criteria initially proposed," he added.

Variables to Consider

However, there are a number of variables to consider in deciding on one method of leasing over another, he said.

Exley Replaces Anderson As President of NCR

DAYTON, Ohio – Charles E. Exley Jr. has been named president of NCR Corp. effective Sept. 1.

A former Burroughs executive vice-president of finance, Exley has also been named a director of NCR and a member of the board's executive committee.

William S. Anderson, who has been both chairman and president since 1974, will continue as chairman and chief executive officer.

Exley, 46, was a member of the four-man operating committee at Burroughs and a director, in addition to his financial post. He was with Burroughs for 22 years.

IBM Names Three to Posts

ARMONK, N.Y. – IBM has announced changes in three executive positions.

Terry R. Lautenbach became president of the Data Processing Division (DPD), replacing John F. Akers who was recently named an IBM vice-president. Lautenbach was previously DPD vice-president, management services staff.

Akers succeeded Allen J. Krowe as assistant group executive of plans and controls for the Data Processing Products Group (DPPG).

The plans and controls functions headed by Akers provide financial, resource management and product control staff guidance to the group's operating divisions, IBM said.

Krowe, an IBM vice-president, was named head of the corporate business plans staff.

Three Groups at IBM

ARMONK, N.Y. – An overview of IBM structure reveals there are three groups: the Data Processing Product Group (DPPG); the Data Processing Marketing Group and the General Business Group.

The DPPG includes the General Products, System Communications and System Products Divisions.

The DP Marketing Group includes the DP Division, Federal Systems Division and the Field Engineering Division.

The General Business Group includes four divisions: the General Systems, Office Products, Information Records and General Business Group International Divisions.

Each has a group staff.

FASB Revises Lease Accounting Draft

(Continued from Page 30)

- The lease term is equal to 75% or more of the estimated economic life of the leased property.
- The present value of the minimum lease payments, excluding that portion of payments representing executory costs to be paid by the lessor, equals or exceeds 90% of the excess of the fair value of the leased property to the lessor over any related investment tax credit retained by the lessor.

If the lease does not meet one of these criteria, the lessee shall classify the transaction as an operating lease.

In computing the present value of the minimum capital lease payments, the lessee uses the incremental borrowing rate unless he knows the lessor's computation of the implicit rate is less than the incremental borrowing rate.

A lessor, however, is required to compute the present value of the minimum lease payments using the interest rate implicit in the lease.

A leveraged lease must meet the first three of the above requirements.

A lessor may account for a lease as a sales-type lease or direct financing if the transaction at its inception meets any one of the above four requirements and also both of the following:

- Collectibility of the payments required from the lessee is reasonably predictable.
- No important uncertainties surround the amount of unreimbursable costs yet to be incurred by the lessor under the lease.

A lessee need not display operating leases parenthetically on the face of the balance sheet.

Less information is required to be disclosed in footnotes of lessees' statements. Lessors' footnote disclosures have been reduced and are applicable only to enterprises whose predominant activity is leasing as a lessor.

Amortization procedures are also covered in the draft. A capital asset recorded under a capital lease shall be amortized in a manner consistent with the lessee's normal depreciation policy for owned assets if the lease meets either of the following requirements:

- Transfers property ownership to the lessee by the end of the lease.
- Offers a bargain purchase option.

If neither of the above criteria is met, the period of amortization shall be the lease term.

Proposed standards for leveraged leases are in essentially the same form as in the previous exposure draft, according to FASB.

The draft also outlines accounting for subleases.

The statement is to be applied to leasing transactions begun on or after next Jan. 1, with earlier applications, including retroactive application, encouraged.

If the statement is not applied retroactively beforehand, disclosure of the balance sheet and income effect of retroactive application is required beginning with financial statements for the year ended Dec. 31, 1977.

For statements of periods beginning after Dec. 31, 1980, the statement is to be applied retroactively. When financial statements are presented in conjunction with such statements, they are to be restated to the extent practicable, but at least as far back as the Dec. 31, 1976 balance sheet, FASB said.

Comments on the revised exposure draft are requested in writing by Oct. 1 and should be sent to: Director of Administration, Financial Accounting Standards Board, High Ridge Park, Stamford, Conn. 06905.

Copies of the exposure draft are available free of charge from the FASB Publications Division at the same address.

POSITION ANNOUNCEMENTS

POSITION OPENINGS

Exciting, dynamic company specializing in computer graphics, process control and data acquisition systems seeks applicants for the following positions.

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The German subsidiary of one of Europe's largest software consulting and data processing service companies (GSi) has openings in Germany for individuals with strong

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position announcements

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The University of Georgia has openings for highly qualified Information System Analysts. Individuals selected will be responsible for translating user requirements into detail system design and programming specs including coordination of implementation and programming effort. Will assist in project definition and function as a member of an applications development team primarily in the accounting, payroll, budgeting, student records, and other university related administrative fields. Good communication skills and ability to effectively interface with users essential. Several years experience developing large scale computer systems required. Online and data base management systems experience desirable. Salary commensurate with experience. Send resume, salary history, and references to Manager, Personnel Department, Personnel Services Building, University of Georgia, Athens, Ga. 30602. An Equal Opportunity-Affirmative Action Employer.

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This new section of *Computerworld* classified display pages is here to provide a marketplace for computer systems that are designed to solve particular industry or application problems. We call them "turnkey systems" because they are usually combinations of hardware and software completely set up to perform specific processing tasks — e.g., hospital billing systems or retail inventory control. All you have to do is "turn the key" and you're in business.

There are now thousands of different turnkey systems available in the United States (and over a thousand "Systems Houses" engaged in the process of creating them). The number of systems is growing steadily.

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As a user of computer services, we hope you'll check the ads in this section each week to see if there is a turnkey system that can help solve one of your processing problems. And as a marketer of Turnkey Systems, we invite you to run a regular ad for your product in this space. The cost is quite reasonable, and a regular small-space ad can be very cost-effective.

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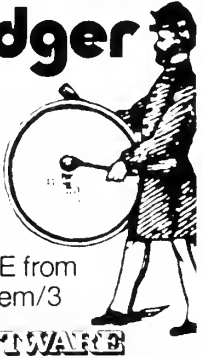

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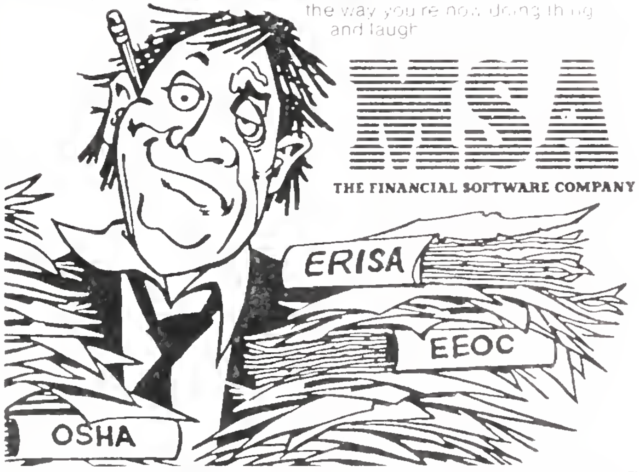

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Pertec Corp. plans to reincorporate in Delaware.

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Compuscan, Inc. has completed a financing of $3.2 million through a private placement of 522,112 shares of common stock.

$$$

Decision Data Computer Corp. has finalized an amendment to its long-term financing program with its banking group, which will provide the company and its leasing subsidiary with a combined revolving line of credit of $24.75 million

MAI Sets Records in Three, Nine Months

NEW YORK - Management Assistance, Inc. (MAI) attained record earnings and revenues for the three- and nine-month periods ended June 30 and Chairman Raymond P. Kurshan predicted the firm's earnings for the year will exceed $12 million.

Sales of Basic/Four systems in the quarter rose 16% from $13.7 million in the preceding quarter to $15.9 million.

Backlog for Basic/Fours and related peripherals totaled $23.3 million at the end of June, a 7% increase in three months.

Sorbus, MAI's maintenance subsidiary, sustained a small loss for the quarter because a rise in revenues was insufficient to offset increased expenses in overhead and parts expenses, the firm said.

Corrective measures have been taken to bring these expenses in line with revenue, MAI said.

MAI's revenues during the quarter rose 30% to $31.6 million compared with $24.3 million in the year-ago period.

Earnings, including a $1.1 million tax credit, rose 63% in the quarter to $3.2 million or 11 cents a share compared with nearly $2 million or 7 cents a share in the year-ago period, when the tax credit was $818,000.

For the nine months, revenues rose 28% to $88.7 million compared with $69.1 million last year.

MAI earned $9.2 million or 30 cents a share, including $3.7 million in tax credits, in the nine months. This represents a 112% increased compared with the $4.4 million or 15 cents a share earned in last year's period, when there was a $928,000 tax credit after the $592,000 write-off of receivables due from Potter Instrument Co., Inc.

During both the three and nine months, revenues from rentals declined. For the quarter they were $3.2 million compared with nearly $3.8 million in the year-ago period while for the nine months the figures were $10.1 million compared with nearly $12 million.

Tab Products Earnings Dip in Year Despite Records in Fourth Quarter

PALO ALTO, Calif. - Tab Products Co. scored record earnings and revenues in its fourth quarter ended May 31.

Although earnings for the full year failed to keep pace with those of the previous year, the growth in revenues reflected the increased shipments of data entry products, according to H.W. LeClaire, the firm's president.

"Earnings for the most recent fiscal year, though the second highest in Tab's history, did not equal those of 1975. This was because revenues from filing systems and DP products, our traditional and most profitable lines, declined during the first three quarters of fiscal 1976 due to the recession," he said.

Quarter Up

During the quarter, earnings rose to $475,000 or 57 cents a share compared with $230,000 or 28 cents a share in the same period last year.

Revenues for the quarter totaled nearly $10.9 million compared with $8.6 million in the year-ago period.

For the year, earnings dipped to $1.17 million or $1.40 a share compared with nearly $1.4 million or $1.63 a share in 1975.

Revenues rose to $37.5 million compared with $35.8 million last year.

Observing that Tab is stronger than previously, LeClaire said the firm is emerging as a manufacturer of machine products for the DP marketplace.

Tab has "virtually completed" R&D work on a terminal punch and a key-to-diskette data entry machine, LeClaire said. The terminal punch will interface with minis and communications equipment where card output only is required, he explained.

Rapidata Earnings Dive In Quarter, Half-Year

FAIRFIELD, N.J. - Rapidata, Inc.'s second-quarter earnings plummeted to $5,000 on revenues of $3.7 million.

This compares with earnings of $261,089 or 14 cents a share and revenues of $3.6 million in the year-ago period.

For the first six months, Rapidata's earnings totaled $282,961 or 15 cents a share on revenues of almost $7.6 million.

In the 1975 half-year, the company reported earnings of $610,925 or 33 cents a share and revenues of $7.3 million.

"The quarterly decline in earnings was attributed primarily to equipment and personnel expansion, the latter primarily in the marketing area," according to Robert J. O'Brien, Rapidata president.

"The impact on margins was further compounded by a flattening of revenues resulting from a fall-off of business within a few major accounts," he added.

Tally Posts Increases in Half-Year

KENT, Wash. – Earnings and revenues were up in the quarter and six months ended June 27 at Tally Corp.

The results reflected "significant growth in the industries" Tally serves, "continued product cost reductions and greater efficiencies throughout the company and the reductions of foreign currency exchange losses to $23,000 from $165,000 incurred in the first quarter," according to President Leslie A. Larsen.

For the quarter, the printer maker's revenues rose to $7.2 million compared with $5.4 million in the year-ago period while earnings, including a $401,000 tax credit, reached $942,000 or 27 cents a share.

This compared with earnings of $205,000 or 9 cents a share in the same period last year, when there was a $20,000 tax credit.

Revenues for the six months reached $13.3 million compared with $9.9 million a year-ago.

Earnings, including a $779,000 tax credit, rose to $1.6 million or 46 cents a share compared with $233,000 or 10 cents a share in the 1975 half-year, which included a $55,000 tax credit.

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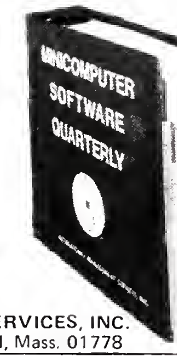

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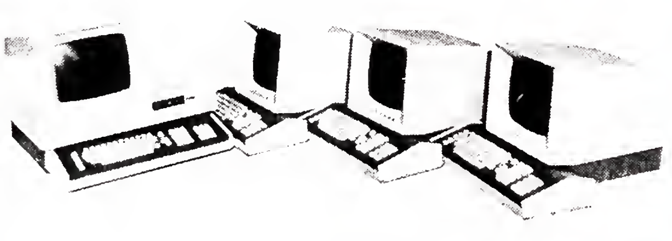

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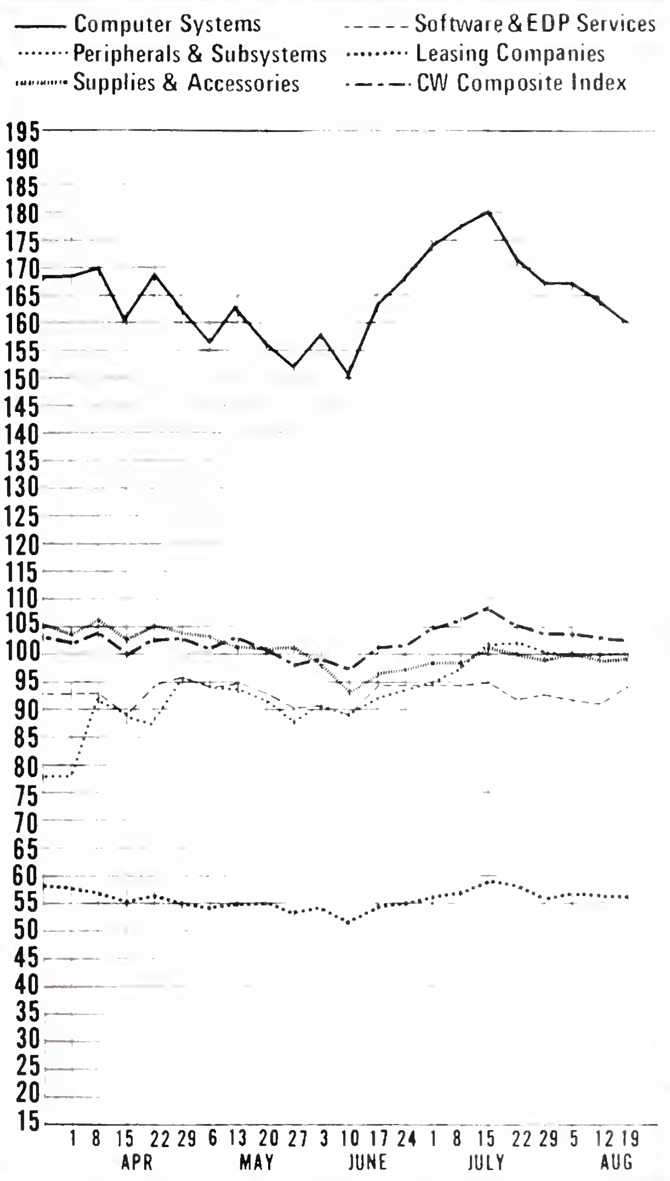

Earnings Reports

GENERAL INSTRUMENT

Three Months Ended May 30

	1976	a19
Shr Ernd	$.39	
Revenue	107,198,283	86
Disc Op	.....	
Earnings	3,216,408	1

a-Restated to reflect ac change for foreign currenc tions. b-Adjusted to reflect dividend in May 1976.

HEWLETT-PACKAR

Three Months Ended Apr

	1976	
Shr Ernd	$.86	
Revenue	279,764,000	248,3
Earnings	23,771,000	23,95
6 Mo Shr	1.40	
Revenue	515,403,000	460,376,
Earnings	38,847.000	42,365,00

INCOTERM

Three Months Ended May 29

	1976	1975
Shr Ernd	$.18	$.36
Revenue	8,246,000	7,613,000
Tax Cred	.....	193,000
Earnings	356,000	713,000

KEYDATA

Three Months Ended April 30

	1976	1975
Shr Ernd	$.11	$.06
Revenue	3,801,000	3,392,000
Tax Cred	147,000	74,000
Earnings	313,000	155,000
9 Mo Shr	.29	.11
Revenue	11,147,000	9,804,000
Tax Cred	371,000	135,000
Earnings	794,000	291,000

LEWIS BUSINESS FORMS

Three Months Ended April 30

	1976	1975
Shr Ernd	$.21	$.37
Revenue	7,834,000	7,912,000
Earnings	303,000	542,000
6 Mo Shr	.42	.73
Revenue	15,508,000	16,951,000
Earnings	604,000	1,059,000

LOGICON

Year Ended March 31

	1976	1975
Shr Ernd	$.98	$.78
Revenue	31,967,000	33,668,000
Earnings	841,000	670,000
3 Mo Shr	.26	.13
Revenue	7,661,000	7,668,000
Earnings	224,000	114,000

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Computerworld Stock Trading Summary

CLOSING PRICES WEONESDAY, AUGUST 18, 1976

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

EXCH		RPICE			
		1976 RANGE (1)	CLOSE AUG 18 1976	WEEK NET CHNGE	WEEK RCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS COPR	84-108	89 1/4	-6 1/4	-6.5
O	COMPUTEP AUTOMATION	10- 19	15 1/4	- 3/4	-4.6
N	CONTROL DATA CORP	18- 27	23 1/4	- 1/4	-1.0
N	DATA GENE[illegible]	40- 60	49 5/8	+ 1/2	+1.0
O	OATAPOINT COPR	24- 46	34	-4 1/2	-11.6
O	OIGITAL COMR CONTROL	2- 7	5 3/8	0	0.0
N	OIGITAL EQUIRMENT	138-181	173 3/4	+5 1/2	+3.2
N	ELECTRONIC ASSOC.	2- 5	2 3/4	- 1/8	-4.3
A	ELECTRONIC ENGINEEP.	7- [illegible]	9 3/8	+ 1/8	+1.3
N	FOXBOPO	28- 47	45 5/8	+1	+2.2
O	GENEPAL AUTOMATION	5- 11	7 5/8	+ 1/8	+1.6
[illegible]	[illegible] CORP	1- [illegible]	1/2	- 1/8	-20.0
N	HEWLETT-PACKARO CO	95-117	102	+ 3/4	+0.7
N	HONEYWELL INC	34- 56	47 3/8	+ 3/4	+1.6
N	IBM	227-280	279 1/2	+2 1/8	+0.7
O	MANAGEMENT ASSIST	1- 3	1 7/8	- 3/8	-16.6
O	MEMOREX	18- 33	26	+1	+4.0
O	MICROOATA COPP	10- 27	27 1/8	+ 5/8	+2.3
O	MODJLAR COMRUTER SYS	5- 14	5 1/4	- 1/2	-8.6
N	NCP	24- 36	35	+1	+2.9
O	PPIME COMPUTER INC	4- 14	12	-1 1/4	-9.4
N	PERKIN-ELMEP	19- 27	21	- 3/8	-1.7
N	RAYTHEON CO	45- 66	63 3/8	0	0.0
N	SPERRY RANO	40- 52	46 1/8	- 7/8	-1.8
O	SYCOR INC	20- 31	23	+ 1/4	+1.0
A	SYSTEMS ENG. LABS	6- 10	8 1/8	- 1/8	-1.5
N	VARIAN ASSOCIATES	13- 17	14 1/8	- 1/8	-0.8
A	WANG LABS.	11- 20	15 5/8	+ 3/8	+2.4
	LEASING COMPANIES				
O	COMOISCO INC	3- 10	7 3/4	+ 1/4	+3.3
A	COMMEPCE GROUR CORP	2- 3	2 1/2	- 1/8	-4.7
A	COMPUTER INVSTPS GRP	1- 3	2 1/4	+ 3/8	+20.0
M	OATPONIC RENTAL	0- 1	1 1/8	0	0.0
A	DCL INC	1- 1	5/8	-	-9.1
N	DPF INC	5- 8	7 1/8	+ 1/8	+1.7
A	GREYHOUND COMPUTER	3- 8	7 3/8	+ 1/4	+3.5
N	ITEL	6- 15	13	- 1/4	-1.8
N	LEASCO CORP	6- 19	16 1/4	- 1/2	-2.9
O	LEASRAC COPR	0- 1	1/4	0	0.0
O	NRG INC	0- 1	3/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 1/2	+ 1/4	+3.4
N	U.S. LEASING	7- 12	9 7/8	- 1/2	-4.8

EXCH: N=NEW YOPK; A=AMEPICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE 810 PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST OOLLAR

EXCH		RRICE			
		1976 RANGE (1)	CLOSE AUG 18 1976	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCEO COMP TECH	1- 2	2	+ 5/8	+45.4
O	ANACOMP INC	8- 11	8	- 1/8	-1.5
A	ARPLIEO OATA RES.	2- 4	4	+ 1/4	+6.6
N	AUTOMATIC OATA PROC	17- 35	32 1/4	-1 1/4	-3.7
O	COLEMAN AMEPICAN COS	3- 6	2 1/2	- 1/4	-9.0
O	COMPUTER DIMENSIONS	3- 7	5 3/8	+ 1/8	+2.3
O	COMP ELECTION SYSTMS	5- 9	5 3/4	0	0.0
O	COMPUTEP HORIZONS	1- 2	2	0	0.0
O	COMPUTER NETWORK	2- 5	3 3/8	+ 1/8	+3.8
N	COMPUTER SCIENCES	4- 8	6 3/4	+ 3/8	+5.8
O	COMPUTER TASK GROUP	1- 1	1 1/4	+ 1/8	+11.1
O	COMPUTER USAGE	3- 6	3 1/8	+ 1/4	+8.6
O	COMSHARE	2- 9	6	- 1/2	-7.6
O	DATA OIMENSIONS INC	2- 4	2 7/8	- 1/8	-4.1
O	DATATAB	1- 1	1 1/4	0	0.0
N	ELECTRONIC OATA SYS.	12- 18	17 1/4	+1 1/4	+7.8
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	+ 1/8	+12.5
O	KEANE ASSOCIATES	2- 4	2 5/8	- 3/8	-12.5
O	KEYDATA CORP	2- 5	1 3/4	- 1/2	-22.2
O	LOGICON	4- 4	3 5/8	0	0.0
A	MANAGEMENT OATA	1- 3	2	- 1/8	-5.8
A	NATIONAL CSS INC	13- 25	22 1/2	0	0.0
A	ON LINE SYSTEMS INC	18- 22	21 3/8	+2 1/4	+11.1
N	RLANNING RESEARCH	3- 5	3 5/8	0	0.0
O	PROGRAMMING & SYS	1- 1	3/8	0	0.0
O	RAPIOATA INC	2- 5	2 3/8	+ 1/4	+11.7
O	REYNOLOS & REYNOLD	13- 21	17 1/4	- 1/4	-1.4
O	SCIENTIFIC COMPUTERS	1- 1	3/4	+ 1/8	+20.0
O	TYMSHARE INC	19- 29	26 3/4	+ 1/2	+1.9
A	URS SYSTEMS	3- 5	4 1/4	+ 1/4	+6.2
N	WYLY CORP	2- 7	2 3/8	+ 1/8	+5.5
	PERIPHERALS & SUBSYSTEMS				
N	ADORESSOGRARH-MULT	8- 13	9 3/8	0	0.0
O	ADVANCEO MEMORY SYS	4- 10	6 5/8	- 5/8	-8.6
N	AMREX CORP	5- 10	8 1/2	- 1/8	-1.4
O	ANOERSON JACOBSON	2- 4	2 3/4	0	0.0
O	APRLIEO OIG DATA SYS	13- 25	20 1/4	-1 3/4	-7.9
O	BEEHIVE MEDICAL ELEC	3- 9	8 1/2	0	0.0
A	BOLT,BERANEK & NEW	7- 11	9 3/8	0	0.0
N	BUNKEP-RAMO	5- 10	9 1/4	0	0.0
A	CALCOMP	4- 7	5 1/4	- 1/4	-4.5
O	CAMBPIOGE MEMORIES	0- 6	5/8	- 1/8	-16.6
N	CENTRONICS OATA COMP	20- 36	32 5/8	-1 3/8	-4.0
O	COOEX CORR	22- 42	35	+2	+6.0
O	COGNITPONICS	1- 1	7/8	0	0.0
O	COMRUTER COMMUN.	1- 6	5 1/4	+ 1/8	+2.4
O	COMPUTER CONSOLES	4- 7	5 3/4	0	0.0
A	COMRUTEP EQUIPMENT	1- 3	1 1/2	0	0.0
O	COMPUTER TRANSCEIVER	1- 3	7/8	0	0.0
O	COMTEN	4- 9	6 3/4	-1	-12.9
N	CONPAC CORP	20- 25	22 1/8	- 3/8	-1.6

EXCH		PRICE			
		1976 RANGE (1)	CLOSE AUG 18 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	OATA ACCESS SYSTEMS	1- 4	3 1/4	0	0.0
O	OATA 100	7- 13	8 1/8	- 7/8	-9.7
A	DATA PRODUCTS CORP	5- 15	13 1/8	- 5/8	-4.5
O	OATA TECHNOLOGY	1- 2	1 1/2	0	0.0
O	DATUM INC	1- 2	1 1/2	0	0.0
O	DECISION DATA COMPUT	1- 4	1 3/4	+ 1/8	+7.6
O	DELTA DATA SYSTEMS	1- 1	1 1/8	+ 1/8	+12.5
N	ELECTRONIC M & M	1- 4	3 3/4	+ 3/4	+25.0
O	FABRI-TEK	1- 1	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 2	1 1/8	0	0.0
N	HAZELTINE CORP	4- 12	8 5/8	- 1/2	-5.4
N	HARRIS CORP	34- 55	52 1/4	-1 3/4	-3.2
A	INCOTERM CORP	9- 20	9 1/4	- 3/4	-7.5
O	INFOREX INC	3- 7	4	+ 1/2	+14.2
O	INFORMATION INTL INC	10- 18	11 5/8	+ 1/2	+4.4
O	INTEL CORP	60-109	63 1/2	+1	+1.5
A	LUNDY ELECTRONICS	4- 7	3 3/4	- 1/4	-6.2
O	MSI DATA CORP	3- 7	6 3/4	0	0.0
A	MILGO ELECTRONICS	15- 21	16 5/8	- 3/8	-2.2
N	MOHAWK DATA SCI	3- 10	9	- 1/8	-1.3
O	PENRIL CORP	1- 3	2 1/8	+ 1/4	+13.3
A	PERTEC COPP	3- 8	6 1/2	+ 3/8	+6.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	5- 10	4 1/2	- 1/2	-10.0
O	QUANTOR CORP	4- 6	4 7/8	- 1/8	-2.5
O	RECOGNITION EQUIR	6- 11	8 1/8	- 1/8	-1.5
N	SANDERS ASSOCIATES	6- 11	8 1/4	- 1/4	-2.9
O	SCAN DATA	2- 4	2 1/8	- 1/8	-5.5
O	STORAGE TECHNOLOGY	9- 13	11 3/4	- 1/4	-2.0
O	T BAP INC	5- 10	5 5/8	- 1/8	-2.1
O	TALLY CORP.	4- 6	4 1/2	0	0.0
O	TEC INC	3- 5	3 3/4	0	0.0
N	TEKTRONIX INC	45- 67	63 3/4	-1	-1.5
N	TELEX	2- 5	3 1/8	- 1/8	-3.8
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	2 5/8	- 1/4	-8.6
	SUPPLIES & ACCESSORIES				
O	ADVANCED SYSTEMS INC	1- 4	3 1/4	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/4	0	0.0
A	BARRY WRIGHT	6- 10	7 3/8	- 1/8	-1.6
O	CYBERMATICS INC	1- 1	5/8	0	0.0
A	DATA OOCUMENTS	28- 42	28 1/2	- 5/8	-2.1
O	OUPLEX PRODUCTS INC	14- 24	14 1/8	- 3/4	-5.0
N	ENNIS BUS. FORMS	6- 8	6 5/8	- 1/8	-1.8
O	GRAHAM MAGNETICS	8- 13	9 3/4	+ 1/4	+2.6
O	GRAPHIC CONTROLS	13- 19	15 3/4	+ 1/4	+1.6
N	3M COMPANY	53- 65	63 3/4	+1 3/4	+2.8
O	MOORE CORP LTD	40- 51	40 3/4	- 1/2	-1.2
N	NASHUA CORR	11- 18	17	- 1/8	-0.7
O	STANDARD REGISTER	15- 19	16	- 1/4	-1.5
O	TAB PRODUCTS CO	5- 11	9 1/4	+ 1/4	+2.7
N	UARCO	21- 25	21	0	0.0
A	WABASH MAGNETICS	4- 8	7 1/8	0	0.0
N	WALLACE BUS FORMS	19- 25	21	+1 1/8	+5.6

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8430	F-1230-00	360024
8433	F-1223-00	360044
8440	F-1221-00	263224

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